

Dr. Ballard's Report on the Sanitary Condition and Administration of the Isle of Wight.

GEORGE BUCHANAN,
Medical Department,
March 24, 1881.

THE Isle of Wight, which is about 23 miles in length from east to west, and about 13 miles wide at its widest part from north to south, is characterised by some geological features which it is necessary that I should briefly point out. From Bembridge Down, near the extreme eastern corner of the Island, to the extreme western part, right across the island near its middle, there stretches a range of high chalk downs, to the south of which the geological formations underlying the surface earth are those of the cretaceous system, while to the north of the downs are the more recent tertiary and post tertiary or drift formations. At the extreme south of the island there are other chalk downs, and between the two series of downs there is a strip of country where the gault and lower greensand come to the surface, extending across from Sandown bay to Brixton and Chale bays. These facts have an all important bearing upon the abundance or scarcity of good drinking water in various parts of the island, a point to which I shall have frequently to allude in the progress of this Report.

The chalk downs and the underlying upper greensand form an extensive collecting area for water, which is held up by the underlying gault, and which, issuing near the bases of the hills on their northern aspect, gives rise to the few streams or rivers which the island can boast of. All of these streams run in a northerly direction except one, viz. the Eastern Yar, which traversing the valley between the two ranges of chalk hills, takes on the whole an easterly direction to terminate in Brading harbour. The water which comes from the southern side of the chalk hills forms only trifling rivulets which speedily fall into the sea, but they are valuable sources of water for all that. To the north of the chalk downs the only water readily obtainable is that which traverses the surface in its northward course from the hills to the sea, surface drainage water from the land, collecting in pools, &c., or such as is collected in pockets of sand or gravel found in the clay, and usually met with at the top of the low hills in this part of the island.

The streams or rivers above mentioned widen out into long estuaries at several parts of the northern half of the island, namely, at Yarmouth, Newtown, Cowes, Wootton, and Brading. At low water much of the beds of these estuaries is exposed.

The total area of the island is about 93,341 acres, and in 1871 the island had a population of 66,219. This population has considerably increased since that year, but the increase cannot be estimated. For the purpose of sanitary administration a total of about 5,465 acres has been placed under the control of Urban Sanitary Authorities; the remainder of the island (87,876 acres) forming the district of one Rural Sanitary Authority. The Urban districts and the approximate magnitude of each, the number of inhabited houses in 1871 and at present, and the population in 1871 are as follows:—

	—	Acres.	Inhabited Houses.		Population 1871.	
			1871.	1880.		
	Newport (Borough)	-	502	1,422	1,951	6,947
	Ryde (Borough)	-	791	2,136	2,588	11,260
	West Cowes	-	391	1,123	1,494	5,730
	East Cowes	-	516	392	617	2,058
	St. Helen's	-	1,890	—	916	?
	Sandown	-	514	434	608	2,320
	Shanklin	-	241	370	567	2,035
	Ventnor	-	220	749	851	4,841

Newport is situated inland towards the middle of the island; the others are on the coast.

For registration purposes the island is divided into five registration sub-districts viz. :—1. Cowes, which includes the town and urban sanitary districts of West and East Cowes ; 2. Newport, which includes the borough of Newport, and the villages of Carisbrooke, (virtually a prolongation of the town of Newport) Gatcombe, Arreton, and Wootton ; 3. Ryde, which includes the borough of Ryde, the urban sanitary districts of St. Helen's, Sandown, and Shanklin, the village or little town of Brading and the villages of Bembridge and Newchurch ; 4. Godshill, which includes the urban sanitary district of Ventnor and the adjoining villages of Bonchurch, St. Lawrence, and the villages of Whitwell, Niton, Chale, Godshill, Kingston, and Shorwell ; and 5. Calbourne, the only town in which is the little town of Yarmouth, but in which are situated Freshwater, and the villages of Calbourne, Shalfleet, Brixton, &c.

The following table shows for the five years 1875–9 the total registered births and the deaths from all causes at all ages, and among children under one year of age, together with the deaths from certain specified diseases. The figures are given for each of the above sub-districts, with the population of each sub-district in 1871 :—

Registration Sub-District and Population in 1871.	Year.	Births.	Total Deaths from all Causes.	Deaths under 1 Year.	Deaths from specified Diseases.							
					Small Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	“Fever.”	Diarrhoea.	Cholera.
Cowes - Population, 11,104.	1875	345	190	24	—	1	—	3	13	4	2	—
	1876	382	239	28	—	—	51	6	3	9	1	—
	1877	396	181	43	—	5	10	6	4	8	3	—
	1878	409	189	48	—	2	—	1	24	4	4	—
	1879	429	150	28	—	—	—	1	—	9	4	—
		1,961	949	181	—	8	61	17	44	34	14	—
Newport - Population, 14,259.	1875	454	345	68	—	2	—	—	6	11	11	1
	1876	428	309	39	2	—	11	1	1	10	6	—
	1877	401	285	48	—	1	—	4	7	5	9	—
	1878	452	327	52	—	8	1	—	22	4	6	1
	1879	417	300	38	—	—	—	2	2	6	1	—
		2,152	1,566	245	2	11	12	7	38	36	33	2
Ryde - Population, 24,394.	1875	729	466	98	—	1	5	8	16	16	25	—
	1876	784	389	63	—	1	22	5	2	10	6	2
	1877	761	391	62	—	6	11	1	10	12	6	1
	1878	798	471	90	—	4	1	1	22	6	14	1
	1879	794	393	68	1	1	—	—	2	7	8	—
		3,866	2,130	381	1	13	39	15	52	51	59	4
Godshill - Population, 10,088.	1875	274	198	26	—	2	1	3	—	2	3	—
	1876	302	170	19	—	—	1	1	1	6	1	—
	1877	296	219	30	—	10	—	1	3	4	1	—
	1878	285	217	36	—	—	—	1	4	4	6	—
	1879	316	238	26	—	—	1	—	2	8	1	—
		1,473	1,042	137	—	12	3	6	10	24	12	—
Calbourne - Population, 6,374.	1875	190	98	21	—	1	—	2	1	3	—	—
	1876	178	63	10	—	1	—	2	—	—	—	—
	1877	183	81	18	—	1	1	—	1	1	—	—
	1878	202	83	16	—	2	—	—	—	1	—	—
	1879	167	78	10	—	—	—	—	2	1	—	—
		920	403	75	—	5	1	4	4	6	—	—

I find on consulting the death-registers that nearly all the deaths included under the head of “fever” in the above table were registered as enteric fever or under one of its synonyms. When I come to consider the sanitary districts in succession I shall endeavour, with the help of the registers and of the books of the Ryde Infirmary, to distribute the deaths from fever among the several sanitary districts in which they

severally occurred. The scarlatina epidemic of 1876 was almost confined to the parts of the island to the north of the chalk downs, and prevailed mostly in the towns of Cowes (West and East), at Ryde and the adjoining populous suburbs in the rural sanitary district to the west, and in St. Helen's to the east of the town.

THE URBAN SANITARY DISTRICT OF WEST COWES.

The old part of the town of West Cowes is built along the west bank of the estuary of the Medina, and on the side of the steep hill rising from it. The streets are narrow and irregular. The main street, bordering the shore, is situated little above the sea level ; and a group of narrow streets of small houses at the southern extremity, occupied by poor persons and others in humble circumstances, are also at a very low level, and this quarter is apt to be flooded at exceptionally high spring-tides. The newer parts of the town, where the streets are wider and better arranged, are situated along the shore of the Solent to the westward, and on the hill side to the south and east of the older part. At this part of the town the elevation reaches about 150 feet. The soil is clay, with some gravel however at the highest elevations. All along the shore of the estuary, where the older houses of the main street back upon it, offensive mud is exposed to a great extent at low water. The resident population are engaged mostly in shipbuilding, or belong to the sea-faring classes, being the families of persons employed about yachts. In the middle of the summer West Cowes is largely resorted to by visitors, and many houses are kept as lodging houses for their accommodation. In some parts of the town there are narrow and ill-arranged courts, occupied by a poor population.

There are no plans of the sewerage of the district, but the surveyor tells me that the houses not draining directly into the sea are all connected with sewers of some sort, and are none of them, so far as he knows, drained into cesspools. The public sewers, however, are of various ages and varying construction, and about those in the older parts of the town little definite information is obtainable. Some of the main sewers in the lower parts of the town have but little fall. There are about 10 out-fall iron pipes, by which, in various places, the sewage is discharged upon the mud on the shore of the estuary, the mouths of these pipes being exposed at low tides ; some of these outlets, when I examined them, were partly filled with filthy deposits. One long sewer reaching from the old town to "Egypt," at the western extremity of the district, and discharging there, has its open end exposed only at very low tides. In addition, private premises, backing upon the estuary, discharge sewage through private drains into the sea, or upon the exposed mud all along the sea-wall in the older part of the town. The consequence of all this is that the water along the shore and the mud exposed at low water habitually stink.

There is no ventilation of the sewers at the heads of the out-fall pipes, nor any worth speaking of in the course of the sewers ; so that, inasmuch as the roadside gullies for the surface water, which is carried into the sewers, are all trapped, the chief escape for sewer air, generated in the sewers themselves, is at the various inlets of drains in and about the houses. The danger of this state of things is enhanced by the pressure of water entering the outlet pipes at each rise of the tide. I myself experienced discomfort from stinks arising from the gully openings in the streets, and I heard from various inhabitants several complaints of the same nuisance. This would be obviated by such free openings as would prevent the accumulation of sewer air, and by keeping all inlets in a clean state. The sewers are never flushed, (trapped though they were), although the Medical Officer of Health has more than once urged this practice upon the Local Board.

In the newer parts of the town the houses are connected with the sewers by means of pipe drains, and the Surveyor tells me that he believes that the house-drains in the older parts are mostly constructed with glazed pipes. But certainly some (probably many) of the house-drains in the older parts are constructed of brick, and some such, destroyed more or less by rats have been reported by the Medical Officer of Health ; and one thus riddled with rat holes was seen by myself. Very few, indeed, of the house-drains are ventilated—even in the best class of houses. Water-closets are in universal use in the town ; where situated—as they are in the best houses,—within the houses themselves, they are supplied by water from a cistern ; elsewhere they either have no water laid on to them, or the water is (in a few instances) supplied by a pipe direct from the town mains.

The whole district is supplied with water from the water works belonging to the Local Board. The water is gathered from the gravel capping some hills to the south

of the town into four open reservoirs, and is furnished upon the intermittent system for about six hours daily. Where there are no cisterns, as is the case in the poorer localities, the water has to be stored in any available vessels, or the people, during the night and much of the day, have to go without water. The water-works manager says that the main pipes are too small to permit of a constant supply all over the district, and that at all times there is much waste of water. The chance (inseparable from an intermittent supply) of air entering the pipes becomes in this town a serious risk to health, since any such air must certainly come from the neighbourhood of water-closets or sinks, or through defects in the mains from the earth of a town where there are old rat-eaten brick sewers and drains. A few houses newly built at the upper part of the town are not supplied with town water, but only with rain water from the roofs, which is stored in tanks; and I understand that two of the principal hotels (on account, it is said, of the high charges made by the Local Board to such establishments) are supplied by shallow wells on their premises. Such water in a town like this must be regarded as suspicious in quality. The Medical Officer of Health, however, does not appear to have reported on this subject.

The scavenging of the town, the removal of domestic refuse, is fairly performed by men in the employ of the Local Board.

Since 1871 the town has been considerably extended by the erection of new residential buildings, but inasmuch as there have been no building byelaws in operation here up to the time of my inspection (although certain byelaws have recently been sanctioned), these houses have been erected without any supervision by the Local Board.

The chief increase has been of houses rated between 10*l.* and 20*l.*, and the next largest increase has been of houses rated between 20*l.* and 40*l.*

Some of the houses, occupied by the poor, I found in a sadly neglected condition, dirty and dilapidated in such a way as to set domestic cleanliness at defiance. Some of the houses I visited were pervaded with a smell of drain air.

The following table shows for recent years the mortality from all causes, and from certain specified diseases. The persons included in it would not appear to have come into the district with their fatal illness upon them. The table also shows cases of certain forms of sickness which were treated by the Poor Law medical officer:—

—	From all Causes.	Deaths.									Pauper Cases.		
		Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1875	-	?	?	?	?	?	1	?	?	?	?	?	?
1876	-	91 (6mon.)	—	—	39	—	4*	—	—	3	?	?	?
1877	-	101	—	4	8	1	1	2	—	15	—	—	—
1878	-	101	—	1	—	—	13	2	1	—	10	—	20 (8 entc.)
1879	-	73	—	—	—	—	6	—	—	6	6	—	19 (8 entc.)

* With the exception of this figure, which refers to the whole of 1876, the numbers given for 1876 relate to deaths in the latter six months of the year only.

I gather from the reports of the Medical Officer of Health, and from the conversations I have had with him and with other medical gentlemen practising in Cowes, that for some years past enteric fever has largely prevailed there, not only in the lowest and poorest part where the district is (as mentioned before) liable to be flooded from time to time, but in other parts of the town also, and even in the new streets at the highest elevations. No parts of the town and no class of houses appear to have been spared, and visitors who have come there for health have carried away the contagion with them to their homes elsewhere.

The Medical Officer of Health records in his pauper practice alone, during 1878, eight cases of unquestionable enteric fever, and 12 of a doubtful character (probably mild cases of the same disease); and during 1879, eight cases of enteric fever, and 11 of other or doubtful character. The full number of cases in all classes of society in the town may be believed, therefore, to have been very considerable. In 1876 there was an epidemic of scarlet fever, which in the last six months of the year caused 16 deaths in West Cowes out of the 51 deaths recorded in the year by the District Registrar for the whole Cowes sub-district. Eight more deaths from the same disease (out of 10 in the whole sub-district) occurred in 1877.

The high mortality from phthisis among the resident population of this district in the course of three years is worthy of remark. The rate is as high as that of England and Wales, mining and manufacturing districts included.

The sanitary administration of the district, judging from the reports of the Medical Officer of Health, and from my own inquiries, appears to have been exceptionally defective.

Up to the middle of 1876 the Local Board had no medical adviser, and were necessarily ignorant (except on casual information) of the prevalence of preventable disease in their district. In that year they appointed Dr. W. Hoffmeister their Medical Officer of Health, at a salary of 26*l.* 5*s.* per annum. Since that time it would appear that but little regard has been paid to his advice. His last two annual reports are replete with complaints of the inaction of the Sanitary Authority, notwithstanding that he had made repeatedly serious and forcible appeals to them to cause the amendment of conditions which were not only dangerous to health, but had actually been the occasion of fatal disease. Being Poor Law Medical Officer he is acquainted with all the cases of disease that occur in the pauper practice in the town, and he receives regular lists of deaths in the district from the Registrar of deaths; but he rarely hears of cases of preventable disease that occur in the private practice of his medical brethren in Cowes. Those cases of zymotic disease which come to his knowledge he deals with according to his powers, and he advises the Local Board to the best of his ability. But he says his efforts are rendered futile in many cases by the lack of the necessary appliances to deal properly with infectious diseases, and by the faulty method of sanitary administration in vogue. Although not appointed under this Board's Order he has endeavoured to carry on his work in accordance with the Board's regulations for the duties of a medical officer of health, and has forwarded copies of his annual reports to the Board. One great difficulty he has had to encounter has been the entire independence of the Inspector of Nuisances, over whose work and mode of working he has had no control, that officer not having been in any way placed under his instructions. Indeed he himself has done much of the work proper to an inspector of nuisances; to the detriment of his ability to advise comprehensively and from a proper view point upon the larger sanitary wants of the district.

Prior to October 1878 there was an Inspector of Nuisances at a salary of 20*l.* per annum, but, when at the above date, this officer resigned his post, the Surveyor, who had a salary of 75*l.* per annum, and was a builder in a large way of business in the town, undertook to perform the duties of inspector of nuisances without any additional salary, and his offer was accepted by the Local Board. He has (as might have been expected) made no systematic inspections, and has confined himself to attending to casual complaints, and to such matters as the Local Board directed him to inquire into at the instance of the Medical Officer of Health. He has occasionally made reports to the Local Board upon such matters as they have directed him to inquire about. These reports have not however been made in a book, but on separate sheets of paper, which he has taken away with him when he has read their contents to the Local Board. The latter have thus not had the ordinary facilities for continuous action in respect of nuisances with which it was their duty to deal; and hence it can be no matter of astonishment that such nuisances reported upon once for all should have been forthwith forgotten until again brought to the authority's notice by the Medical Officer of Health. In dealing with nuisances the practice has been either to write to the person in fault, or for the Inspector to see him. Notices of abatement under the statute have very rarely indeed been served, and no systematic efforts have been made to prevent the recurrence of nuisances liable to recur. Beyond limewhiting in some instances there has been no systematic attempt made to procure the disinfection of infected houses or things.

There is no isolation hospital provided for the use of the district, although the Medical Officer of Health has on more than one occasion recommended its provision, and although in 1876 the Local Government Board urged upon the Authority the desirability of such a step. Nor has a Mortuary been provided by the Local Authority such as can be used for the purposes of the 142nd section of the Public Health Act.

THE URBAN SANITARY DISTRICT OF EAST COWES.

This district consists of the old irregularly-built little town of East Cowes, situated on the eastern shore of the estuary of the Medina, and on the slope of the hill rising from it towards Osborne, on which slope numerous villas and regularly-arranged streets of

houses have been erected, and are still in course of erection. The main street of the old town is at about the sea level, and some courts and streets at the rear of it are about 18 inches below the level of high water at spring tides. Part of the town is, in fact, built upon fine shingle, into which the sea water percolates at each tide. The hill above has a clay sub-soil, and is capped with gravel. The highest elevation of the district in this direction is about 180 feet. The population is chiefly engaged in shipbuilding and sea-faring pursuits. Since the extension of building up the slope of the hill the old town is said to be less crowded than it used to be. The town was sewered in 1862 by means of a long brick tank sewer in the principal street, and pipe sewers elsewhere. Arrangements were also made for flushing, but no flushing has been performed, neither has any provision been made for the ventilation of the sewers. Various engineering mistakes, and in some places bad workmanship and bad management, have interfered from time to time with the proper and efficient operation of these sewers. Up to the present time a great and important part of the new town on the slope of the hill has remained unsewered, the houses being in such cases drained into cesspits, which having overflows on to the surface of the ground or into ditches, have been the cause of many nuisances. The Local Board, however, have now adopted plans for extension of the sewers into these parts of their district, and for the amendment of mistakes committed in their existing sewers. The house drains are usually 6-in. glazed pipes, but sometimes are constructed of common earthen pipes. None are ventilated. The Local Board have provided for the water supply of part of their district by tapping the gravel bed at the summit of the hill, and by conducting the water into two reservoirs capable of containing respectively 500,000 and 100,000 gallons. But the supply thus obtained is insufficient in dry weather, while in wet seasons a good deal of water which might be stored, were there more storage space provided, runs away to waste. The elevation of the reservoirs also is not such as to permit of the upper parts of the new town being supplied from them. The supply is intermittent, and during about two months in the summer can usually only be given for three hours daily. Where the town water cannot be supplied the inhabitants have to depend for water upon underground rain-water tanks, which are apt to fail in dry seasons, or upon superficial wells, the water of which is liable to pollution by soakage from cesspools, &c. The Local Board were, at the time of my inspection, considering the best mode of remedying this serious defect in their district, and I pressed upon them the importance of speedily arriving at some determination upon the subject. In addition to the public water supply described there is, at the outskirt of the old town, a public well, sunk 16 or 18 feet into gravel, and much resorted to. It is so situated as to be little liable to pollution except at seasons of very high tides, when sea water has occasionally run into it.

The water-closet is in universal use, except where in some old parts of the town there are a few common cesspit or bog-hole privies. It is only in rare instances, however, that water is laid on to the closets.

The scavenging of the district is fairly performed by the Local Board. Building is actively going on, but no supervision is exercised over it by the Local Board, whose building by-laws are most defective. This is unfortunate, since by the neglect of such supervision the Local Board are laying up for themselves much trouble in the future, and losing a grand opportunity of providing for the healthiness of what is assuredly about to become a considerable town.

For the most part the houses occupied by the poorer classes are in a decent condition.

The following table shows for recent years the mortality from all causes, and from certain specified diseases, after exclusion of persons who are stated to have come into the district with their fatal illness upon them. It gives also a few facts about sickness treated by the Poor Law Medical Officer.

	From all Causes.	Deaths.								Pauper Cases.			
		Small Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1875	-	?	?	?	?	?	1	?	?	?	?	?	?
1876	-	28 (6 mon.)	—	—	11	—	4*	—	—	1	?	?	?
1877	-	38	—	1	—	—	2	—	—	4	?	?	?
1878	-	25	—	1	—	—	2	—	—	2	—	—	—
1879	-	24	—	—	—	1	2	—	—	3	—	—	1 (enteric.)

* With the exception of this figure, which refers to the whole of 1876, the numbers given for 1876 relate to the deaths in the latter six months of the year only.

There is no doubt that enteric fever has prevailed at East Cowes to a considerable extent, and that the Medical Officer of Health has been justified in attributing its prevalence (as he has in his reports to the Local Board) to the various defects in drainage and water supply which I have been describing. In the latter half of 1876 scarlet fever also was epidemic, and as many as 11 deaths were registered from this disease. No deaths from scarlet fever occurred however in 1877. Nine deaths are recorded as due to phthisis, out of a total of 87 deaths from all causes. All of them appear to have been deaths that occurred among the resident population.

As for the sanitary administration of the East Cowes district:—the Local Board have clearly seen the necessity for improved drainage and extended water supply, and have taken steps, although slowly, to provide them; but in the meantime nuisances capable of remedy by interim improvements have continued unabated. Most of the dangerous nuisances have had reference to excrement. There is in the island an entire ignorance of the various dry methods of disposing of excrement, so that the Local Board of East Cowes were content with the old bog-hole privies, where they could not at once have water-closets.

In the middle of 1876 Dr. W. Hoffmeister was appointed the first Medical Officer of Health, at a salary of 8*l.* 15*s.* per annum, but not under the Order of the Board. Being the Poor Law Medical Officer he is acquainted with all the cases of sickness that occur in the pauper population, and he receives returns of deaths in his district from the Registrar. He reports fortnightly to the Local Board, and his annual reports contain good general advice to the extent that he felt himself competent to advise. But I cannot gather that the prevention of infectious disease has been dealt with in the way that it might have been dealt with, had the powers given for this purpose by the Public Health Act, been put into operation. In few houses has it been practicable to obtain the isolation infectious cases, and the Local Board have declined to provide means of isolation, although advised to do so by this Board, and by their own Medical Officer of Health. Neither is there any Mortuary provided that can be used by the Sanitary Authority under section 142 of the Public Health Act, nor any public appliances for the disinfection of infected clothing, &c.

The Surveyor of the Board (a builder in business in the town) is also the Inspector of Nuisances. His salary for both offices is 40*l.* per annum. He is not appointed under the Board's Order. He is in no relation with the Medical Officer of Health, acting in the execution of his duties without reference to that officer. He says he inspects his district to seek out nuisances. He keeps a report book, but it does not show the directions given by the Local Board with regard to nuisances, nor could I find these directions entered in the minute book of the Local Board.

THE BOROUGH OF NEWPORT.

The borough of Newport has had its boundaries altered since the passing of the Public Health Act, namely, towards the close of 1876. It now includes the old town of Newport, part of the suburb of Shide, a new village on the west, and the adjoining villages or hamlets of Hunny hill on the north, and of Barton village and Cross lanes on the opposite side of the estuary to the north-east. Prior to this the last-mentioned hamlets were within the sanitary jurisdiction of the Rural Authority.

The old town of Newport (the capital of the island) stands within a fork or semi-circle, formed by the two streams of the Medina and the Lukely, at the confluence of which the estuary of the Medina commences. From this point the estuary passes northwards to fall into the sea at Cowes. Vessels of small burthen come up to the town, where there are quays for loading and unloading them. Banks of filthy mud are exposed at low water in that part of the estuary which traverses the borough, and partially bounds the old town. There are mills where the water is dammed back, both on the Medina and on the Lukely, for some distance above their confluence. The lowest levels of the borough are not above high-water mark, and these parts are liable to occasional flooding. The old town stands on land which rises gradually from this level to elevations of 20 to 40 feet above ordnance datum, but beyond the old town and notably towards Hunny hill, Barton village and Cross lanes, the surface rises more abruptly; the elevation at the boundary at Hunny hill is 85 feet, at Barton village the elevation is about 88 feet, and at Cross lanes about 65 feet. There is also a great rise towards the village of Carisbrooke (which unfortunately was not, at the revision of the borough boundary, included within the borough), where the elevation at the boundary is about 56 feet.

The sub-soil is mostly clay, with some gravel, and at one part some chalk at the highest elevations. In fact the borough stands just at the foot of one of the chalk hills of the range which traverses the island.

The town is pretty regularly built, with streets of fair width, and in some cases of good width. There are, however, 8 or 10 courts occupied by poor persons. Some of these courts are very narrow and confined.

There is only one part of the old town which is not sewered, and in this part the difficulty assigned is that of obtaining an outfall without polluting the stream of the Lukely. Steps are now being taken to sewer the outlying hamlets which have recently been included within the borough, and where the houses are mostly small and the population is in comparatively humble circumstances or actually poor. Some of it, namely at Barton village, has already been sewer'd. But ventilation of the sewers throughout the borough has been altogether neglected; there are strong prejudices in the minds of many of the Town Council against such ventilation. The necessity for such ventilation was impressed upon the Council by this Board's Engineer-Inspector, Mr. Morgan, on occasion of an application for a loan for works of sewer'ing, and an additional 1,000*l.* above the amount asked for was sanctioned for this purpose. But the ventilation is still in abeyance.

There are four outfalls from the sewers of the old town into the estuary of the Medina as it traverses the town, and there are two similar outfalls from the Barton village sewers on the opposite side of the river. The outfalls are provided with siphon traps, so that there can be no escape of sewer air that way. The street gullies being also trapped, the only mode of exit of the dangerous sewer air is at the inlets of the drains in and about houses.

The Surveyor says that when from time to time he has had opportunities of inspecting the old sewers (which were built of brick), he has found them sound and in good working condition. He says that in dry weather the sewers of the old town are occasionally flushed.

The result of discharging the sewers into the town portion of the estuary is to cause the mud, forming its bed at this part, to be largely mixed up with filthy deposit from sewage. The emanation from this sewage-polluted mud cannot fail to be unwholesome.

For the most part pipe drains have been used to connect private premises with the sewers, but in an old town like this there are, of course, some brick drains also, which are liable to destruction by the rats which always abound at ports. The Surveyor says that the condition of such drains is always investigated when occasion offers and decayed ones are replaced by pipes. But there is much doubt as to the pipe drains having been always laid with due precautions, since the Council and their late surveyors have been very lax in the supervision which their byelaws provide for their exercising over the mode of laying house-drains. There have been complaints of stink on private premises, some of which were mentioned by the Medical Officer of Health in his last annual report; and the present Surveyor is of opinion that faulty drains have probably been the cause of some of the complaints. Want of ventilation of the sewers and house drains, however, is doubtless chargeable with much of the offence. The air of sewers and drains must find vent somewhere, and if no provision is made for its escape in convenient places and for its free dilution with atmospheric air, it will escape in inconvenient places where its escape will endanger the health of residents in the place.

Waterclosets are in common use throughout the borough; but in places not yet sewer'd, bog-hole or cesspit privies are in use. They are, however, well looked after, and for the most part are in fair condition for such places. Some of them which I saw at Cross Lanes, however, were very objectionable and productive of nuisances. As the sewer'ing is extended these privies are being replaced by waterclosets.

For the most part the houses in the borough, even in the suburbs, are supplied from the town water-works with water derived from a well in the chalk at Carisbrooke. The water is very abundant at all seasons of the year, being more than sufficient for the requirements of the inhabitants of the borough. It is supplied by pipe and tap on the constant system from two covered reservoirs, the overflows from which are into an open stream. But there are several private wells also in use in the borough, the water of some of which is manifestly unwholesome, and that of all more or less suspicious. As occasion has offered the Council has required town water to be taken, and the use of these wells to be abandoned for drinking purposes.

The removal of domestic refuse is performed by a contractor on behalf of the Local Authority. It is very imperfect; I noticed considerable accumulations of filth and refuse in several parts inhabited by the poorer class of the population. The emptying of bog-hole privies is expected to be performed by the householders.

The courts inhabited by poor persons were mostly ill-paved or not paved at all, ill-drained, and generally filthy, with all sorts of accumulations in them, and sometimes with an insufficiency of privy accommodation; and in some instances the privies themselves were ill-constructed, filthy, and dilapidated. The houses also in the courts were in several instances dark, close, unventilated, dirty, and dilapidated. They had evidently been greatly neglected by the Local Authority and the Inspector of Nuisances. The worst of the courts is a horrible place known as Tontine yard.

Pigs are very unwholesomely kept in undrained and filthy sties in many of the poorer parts, and in a manner to create nuisances and endanger health. Some of the slaughter-houses in the town were in a disgraceful condition of filth. Both pig-keeping and slaughtering require to be regulated by new and strict byelaws.

New houses have been erected from time to time without the necessary supervision requisite to secure the observance of such building byelaws as the Council has had. It is to be hoped that, when the new and improved byelaws now in hand shall have been sanctioned, the Council will see in the interests of the inhabitants of the borough that they are duly observed.

The following table shows for recent years the mortality from all causes, and from certain specified diseases, in Newport, after exclusion of persons who are stated to have come into the district with their fatal illness upon them. It also shows the number of cases of certain forms of sickness treated by the Poor Law Medical Officer.

	From all Causes.	Deaths.									Pauper Cases.		
		Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1875	-	138	?	?	?	?	6	?	?	?	?	?	?
1876	-	127	—	—	9	1	4	1	—	13	24	—	6 (1 Entc.)
1877	-	160	—	—	—	5	2	4	—	14	2	7	4 (3 Entc.)
1878	-	196	—	6	—	—	3	7	—	11	1	1	10 (8 Entc.)
1879	-	179	—	—	—	2	4	4	—	20	2	—	19 (10 Entc.)

There is no record of the cases of "fever" which occurred in private medical practice in the borough, but considering the number of fatal cases they must have been considerable every year. With the absolute certainty of the inhabitants being exposed to the influence of drain and sewer air within and about their houses, the occurrence of enteric fever can be no matter of astonishment. Were it not for the constant supply of good water this disease would probably have been more prevalent than it has been. The mortality from phthisis has been small compared with some other urban districts of the island.

Mr. F. B. Tuttiett, the Medical Officer of Health, appointed under the Board's Order, is paid a salary of 50*l.* per annum. Part of his district lies in the Newport and part in the Cowes Registration sub-district. From the Newport Registrar he receives regular weekly returns of deaths, but the Cowes Registrar sends the returns irregularly, often five or six weeks' returns together. Mr. Tuttiett, being Poor Law Medical Officer for Whippingham, is cognizant of all cases of sickness that occur in that part of the borough which includes Barton village and Cross Lanes, but he is not Poor Law Medical Officer in the rest (town part) of the borough, and in respect of this portion he is ignorant of the cases of pauper sickness. There are no public medical charities in the borough, and private medical men do not, as a rule, inform him of private cases of sickness even when his services might be of value. So that on the whole he has very imperfect information as basis of action. He says he makes systematic investigations of the state of his district, and from time to time accompanies the Inspector of Nuisances in his inspection. I found him well acquainted with the district. The reports which he makes well and carefully, and at short intervals, to the Council, are always read, considered, and acted upon according to their judgment. He investigates systematically every occurrence of dangerous infectious disease which comes to his knowledge, and deals with the cases so far as he can in the absence of facilities which ought to exist. He has given statutory certificates as to overcrowding, but he has not given such other certificates as would enable the Authority to ensure efficient disinfection of infected houses and things in the way prescribed by the Public Health Act. [From my own experience as a health officer I am satisfied that the

giving of certificates under sect. 120 is a proceeding on the part of a health officer essential to good administration, and a practice which ought to be systematically pursued. But it is a practice entirely neglected, not in Newport only, but throughout the Isle of Wight.]

For some time past, in consequence of the failing health of the late Inspector of Nuisances, the systematic work of this officer has been much neglected. But at the time of my inspection a new Surveyor, who is also Inspector of Nuisances, had been appointed, and I found him actively engaged in the endeavour to make himself acquainted with the condition of the borough, and in getting obvious nuisances dealt with under the Statute. He is paid a salary of 60*l.* per annum as Surveyor, and 60*l.* per annum as Inspector of Nuisances (appointed under the Board's Order.) He has not as respects his work as Inspector been placed by the Authority in due relations with the Medical Officer of Health.

When nuisances have to be abated, statutory notices are served, and the cases are now well kept in view until the Council are satisfied as to their abatement. With an active officer and a willing Authority I anticipate considerable improvement in the cleanliness of the town. The inspector keeps a report book, but not a continuous record book.

A site for an isolation hospital has, I learn, been obtained ; but no steps have yet been taken towards the erection of a hospital. There is no public mortuary provided by the Authority, such as could be used for the purposes of section 142 of the Public Health Act. Nor has any disinfecting apparatus been provided for the disinfection of infected clothing, &c.

THE BOROUGH OF RYDE.

The borough of Ryde occupies the face of a hill which slopes mainly in a north-easterly direction, but a part of it in a north-westerly direction. The town of Ryde lies on the north-easterly slope, and is much exposed to the north-east winds. The slope is steep. The most elevated part of the town (near the Infirmary) stands at an elevation of 155 feet above ordnance datum. The lower part of the town stands at about the sea-level. The highest part of the whole district, however, is at its boundary, viz., 193 feet. The sub-soil at the lower and northerly parts is clay, with here and there gravel and sand, and a little stone. At the higher parts the sub-soil is brick-earth with gravel and some sand. At the extreme north-east, close to the shore, there is a part (formerly called the Duver) where some streets are built upon a shingly gravel, into which the tide used formerly to percolate readily. The Surveyor believes that this percolation has now been obviated in great measure by the sea-wall constructed of late years. There is a little marshy land to the east of this, between the town and St. Helen's Local Board district, through which a brook, now improved by embankment, &c., runs. Formerly on some occasions of high tides this marshy land used to be flooded, but this can scarcely happen now. There is another part, viz., at Pier Street, close to the shore, where the tide still percolates into the shingle on which this part of the town is built. In some places at the top of the town a running sand, full of water, is found at a depth of 6 or 8 feet from the surface. In other parts where clay predominates, the depth at which water is reached is very various. The town is regularly built, and with the exception of the High Street, the streets are, on the whole, of a good width and airy. There are a few courts, chiefly about the High Street, which are occupied by a poor population. The tide runs out a long way, leaving exposed a great breadth of wet sands, which are muddy, and sometimes offensive to the smell near the shore. The whole town is now completely, and so far as I can learn, well and efficiently sewered, and there are two outfalls into the sea by means of iron pipes carried out across the sands to a spot at which their mouths are covered, even at the lowest spring tides. One of these outfalls is at the eastern, and one at the western side of the town, not far from the pier, which is situated between them. The latter outfall is complained of as a source of nuisance to the yachts and shipping moored off the pier, and to promenaders and others who use the pier, or work at the pier head. The complaint made is of the offensive smell of the water at low tides, in consequence of its admixture of sewage. No similar complaint is made of the eastern outfall. The reason of this lies in the peculiarity of the direction taken by the tide in the Solent at this place. instead of the tide running westward during the whole period of the flow, and east-

ward during the whole period of the ebb, it runs eastward, that is from the western outfall towards the pier, not only during the flow, but during the latter half or more of the ebb. Hence during the whole time that the water is low and the sewage least diluted with sea water, the polluted water runs in the direction towards the pier.

Up to about five years ago the sewers of Ryde were wholly unventilated, but during the last few years, not only have ventilators been put into the sewers that were being newly constructed, but the sewers previously constructed have been ventilated from time to time. Still, however, there remain in various parts long lengths of sewers without any ventilation. The ventilators are the ground of many complaints of stink issuing from them. There are two reasons for this; one is that the ventilators are not yet sufficiently numerous, and the other that those which have been put in are not constructed upon the best possible plan, being obstructed by what are termed "dirt-boxes," suspended beneath the gratings at the man-holes and lamp-holes. I have explained to the Surveyor the nature of the improvements which ought to be made. There are good arrangements for periodical flushing of the sewers. There is a separate system of sewers for carrying away the surface water from the roads. With the exception of some detached houses at the outskirts of the town, all the houses are connected with the sewers, and probably with the exception of the unconnected houses (which are annually becoming fewer) there are but few houses now drained into cesspools. The Surveyor believes, that speaking generally, the house drainage is efficient; where found defective (as where old brick drains exist) it is improved from time to time as occasion offers. As a rule, however, there is no ventilation of house drains. Even in the construction of new houses this has not been adequately insisted on, the only requirement there being that the water-closet soil pipe should be prolonged to above the eaves. The pipes from most kitchen sinks (trapped only by means of a bell trap) pass direct into the house drains, some only having been disconnected under orders from the Authority. From the various causes referred to, therefore, there must be ready access of sewer and drain air into the atmosphere of dwelling houses. Water-closets are in universal use in this district. The water-closets of the smaller houses are situated out of doors, but probably all houses above an annual value of 16*l.* have inside water-closets. Outside closets have commonly no water laid on to them.

The scavenging of the town is effected by contract. In some of the principal streets domestic refuse, put out in boxes, is collected daily. In other parts the bye-laws require that covered receptacles shall be provided, and the contractor undertakes to remove accumulated refuse from every house on a specified day in each week. But this latter provision has been a good deal neglected. Not only did I meet in various parts of the town with considerable and evidently long neglected accumulations of offensive filth and domestic refuse in the yards of houses, but such filth was lying loose in odd corners, or sometimes scattered about the yards in all directions, no ash-bin or other fixed receptacle being in existence on the premises. The Surveyor tells me that there has been considerable difficulty in getting this part of the contract work properly done. The Council have power to fine the contractor for neglect, but have only exercised this power to the extent of fining him one shilling in cases where neglect has been proved.

The water supply of the town and district is from the water-works of the Corporation, situated at Ashey Down, about four or five miles off, where the water is derived from a deep well in the chalk hill, and from some springs on the opposite slope. These works are about to be extended, and the supply, it is expected, will be largely increased. The daily supply to the district (including a small part of the suburbs of Ryde, outside the borough, and in the Urban Sanitary district of St. Helen's, and in the Rural Sanitary district) is from 280,000 to 400,000 gallons. When the supply was given first, viz., in 1855, it was given on the constant system, but there was found to be a good deal of waste, so that the supply was after a time given intermittently, and it is so given now. The water is on from 7 a.m. to 7 p.m. daily. Out of 2,588 houses in the borough, there are 79 not yet supplied with the town water. These houses derive their supply from wells, or take it from their neighbours who are so supplied. The well waters are necessarily of suspicious quality. The town supply for drinking purposes is usually by pipe and tap (situated usually over the sinks) direct from the main, but in some houses, where there are internal waterclosets, there are cisterns, and in some such cases the drinking water is drawn from the same cistern that supplies the closet. Some waterclosets are supplied with water by pipes direct from the mains. Waste pipes leading

to the house drains are nearly done away with, warning pipes, opening on to the surface of the ground, having been substituted for them. The dangers incident to the intermittent supply are, it is believed, lessened by the use of ball-hydrants in the main, by means of which, when the mains are emptied of water, they are filled with air from the streets, and not from polluted sources which might otherwise furnish it.

The courts are many of them filthy on the surface, very badly paved, and ill-drained. It was in the back premises of these that I mostly found the accumulations of filth and domestic refuse which I have mentioned above.

Plans of new houses are examined, and the buildings are inspected by the Surveyor while in progress, but their fitness for habitation, when they are finished, is not certified as required by the building byelaws of the Authority. These byelaws are very imperfect in many important particulars. I understand that new byelaws, based upon the Board's model, are in course of preparation.

Animals—pigs, cows, and horses are being kept in many parts of the town in a most filthy and disgusting manner. The mayor and ex-mayor, who kindly accompanied me in my inspection of the town, expressed themselves astonished and vexed at the disgraceful condition of the piggeries, cowsheds, and stables, which are met with at the rear of houses in apparently clean and respectable streets. Many of the slaughter-houses were badly constructed and arranged, and equally or almost equally filthy. Yet there are byelaws (imperfect, however, and requiring to be remodelled) for regulating all these things.

The houses occupied by the poorer classes were generally speaking clean, but some of them were ill-ventilated and a few overcrowded.

The bakehouses were in several instances dark and dirty.

The following table shows for recent years the mortality from all causes, and from certain specified diseases after exclusion of persons who are stated to have come into the district with their fatal illness upon them. It also shows the number of cases of certain forms of sickness among persons belonging to the district who were treated by the Poor Law Medical Officer or in public medical institutions :—

	From all Causes.	Deaths.								Cases.			
		Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1875	-	228*	—	—	—	1	7	15	—	34	?	?	?
1876	-	190*	—	—	11	2	4	3	—	30	?	?	?
1877	-	181	—	5	—	1	8	4	—	31	22	—	27 (Entc.)
1878	-	183	—	—	1	10	1	2	—	22	12	—	26 (20 Entc.)
1879	-	148	1	1	—	—	4	3	—	20	1	—	25 (Entc.)

* These figures include deaths of strangers in the Ryde Infirmary.

The deaths from "fever" were, with one doubtful exception (registered as "brain fever"), deaths from enteric fever, so that this disease must be regarded as more prevalent than it ought to be, and this view is confirmed by the number of cases that occurred in the public practice of the borough. The mortality from phthisis among residents was very high indeed. As regards fever, perhaps the lack of due precaution to prevent the access of sewer and drain air to the interior and about houses may have been one cause of its prevalence. The great prevalence of phthisis points to the necessity for more care being bestowed upon land drainage, and other precautions against a damp atmosphere within houses being taken under proper building byelaws, and to such other improvements in the sanitation of houses, especially as respects surface drainage and ventilation, as the Authority have power to enforce.

The Medical Officer of Health, Dr. Wilks, was appointed in 1874. He is paid a salary of 80*l.* per annum, and since the year 1877 has been appointed under the Board's Order. He receives weekly lists of deaths from the Registrar, and has ample information from various sources at his command of all cases of sickness which occur in the pauper medical practice, and in the charitable institutions for treating sick persons in the borough. But he obtains no systematic information as to infectious diseases occurring in private practice. When he receives information of sickness or death from dangerous infectious diseases he says he visits and inquires to the best of his ability into the

causes in operation, and enters his observations in a journal. His annual reports are lengthy statistical documents containing some good general advice, but telling little of the actual sources of diseases observed during the year or of the practical details of work done under his direction or guidance. The Inspector of Nuisances is placed implicitly by the Council under his orders, but although he frequently gives him directions, and requires results to be reported to him, he does not systematically lay out the work of that officer. There is an isolation hospital provided by the Authority, but it has very rarely been used, and certificates respecting the disinfection of infected houses and things have never been given or required. No record has been kept of such disinfections as may have been performed, though it is especially desirable in cases falling within the terms of section 128 of the Public Health Act, 1875, that certificates should be required of disinfection having been performed "to the satisfaction of a legally qualified medical practitioner." There should be no question capable of being raised upon such a matter as this, especially in a town frequented by visitors. No public appliances have been provided for general use by the inhabitants of the Borough for the disinfection of infected clothing, &c.; nor yet a public Mortuary that can be used by the Sanitary Authority for the purposes of the 142nd section of the Public Health Act.

The Inspector of Nuisances appointed under the Board's order at a salary of 60*l.* per annum is a veterinary surgeon in practice, and holds also under the Corporation the office of Inspector of Cattle (imported) at a salary of 20*l.* devoting much of his time to the duties of this latter office. He does not keep a continuous record book. He says he makes systematic inspections, and his report book appears to show that some such inspections are made. But the condition of filth and neglect in which I found some parts of the town, which from their character ought to have been particularly well looked after, impress me with the belief that the inspection of nuisances has been performed very inefficiently.

THE URBAN SANITARY DISTRICT OF ST. HELENS.

This is a strip of country covering about three square miles to the east of the borough of Ryde and in the Ryde registration subdistrict, and although it has been found convenient to form it into an urban sanitary district, is to a large extent rural in its character. But at its western extremity, on the slope of a steep hill which faces westward and overlooks the marsh and narrow valley which separates it from the town of Ryde, there has for some years been growing up a new town, which is now spreading in all directions and occupying the summit as well as the slope of the hill. This new town has at present no aggregate name, but its various parts pass under local designations, viz., Oakfield, St. John's Park, High Park, and Elmfield, the last being on the summit of the hill and extending down its eastern slope. These several parts of the new town have as yet distinctive features. Oakfield is a little colony of persons in humble circumstances, occupying low-rented houses, most of them with little gardens or yards attached. Until taken in hand by the Local Board it was greatly neglected and a source of trouble and annoyance to its neighbours in Ryde. Its recent extensions have consisted of a better class of houses and a population of better character. St. John's Park consists of high class villa residences, High Park consists of wide streets of middle class houses, and Elmfield mostly of middle class houses also. Along the shore are two villages which are in progress to form little towns viz., Spring Vale, about a mile to the eastward of Ryde, and Sea View, half a mile further on. These are separated by some marshes which have the hamlet of Saltern at their margin. They chiefly consist of villa and middle class houses resorted to by visitors in the visiting season of the year. Inland, about half a mile from Sea View, is the little village of Nettlestone on the top of a hill; and at the extreme end of the district, also upon a hill overlooking and sloping south-east to Brading harbour, lies the village of St. Helens, the houses of which mostly surround a very large village green. The inhabitants have done well to recognise sufficiently early the altering character of this district, and they may usefully give still more effect to this recognition by reconstructing upon the Board's model their building byelaws, at present defective in some essential particulars. They can thus secure that the dwellings being erected shall possess all the requisites for wholesome and secure habitations. Since their formation in 1872 the Local Board have done a great deal of very useful work, not the least of which has resulted in a great improvement in Oakfield. But they have had and still have many difficulties to encounter, among which may be especially mentioned that of securing to their growing population an

ample supply of unquestionably good water. I shall proceed to point out, in describing the sanitary condition of the district, what has been done, and in some important particulars what still requires to be done.

The whole of the new town and the west end of the district has been sewered, and the sewage is discharged through the Ryde system of sewers and by its eastern outfall into the sea. Spring Vale, Sea View, Nettlestone, and St. Helen's village have also been sewered, the two former having outfalls into the sea, and the two latter upon agricultural land in the vicinity. The sewers put in by the Local Board at Oakfield were originally provided with means of ventilation, but since the inhabitants found that stink issued from the ventilators some of them have been closed, either by the inhabitants themselves (with the passive concurrence of the Local Board) or by the Local Board. There is now no ventilation at Sea View or at Nettlestone, and very little anywhere else. Arrangements have also been made for flushing the sewers, but in consequence of the deficiency of water the flushing has not been carried out properly or thoroughly at all times. For the most part the houses in the sewer parts are connected with the sewers, but there are in some places houses still unconnected which might be and ought to be so connected. House drains generally are not provided with means of ventilation.

In the sewer parts of the district waterclosets are in general use, but commonly no water is laid on to them, the flushing of the pans being dependent upon the house slops discharged into them.

The Local Board has not provided for the scavenging of the district, except that in St. John's Park they have undertaken to clear the domestic ash-pits. Elsewhere the inhabitants are required by a byelaw of the Local Board to keep their premises free from accumulations of domestic refuse. It is supposed that, as most of the inhabitants either have gardens attached to their houses or allotment gardens away from their houses, the refuse will be used in them; but at Oakfield I found in the yards of many of the dwellings considerable accumulations of filth, which evidently had been there for a very long time, and which, being in a state of decomposition, were calculated to endanger health. The Inspector of Nuisances admitted that he had not interfered with these nuisances, and the danger of permitting them does not appear to have been represented to the Local Board by their Medical Officer of Health.

During the last few years the water mains of the Ryde Corporation have been extended into Oakfield, High Park, St. John's Park, and most of Elmfield, and the polluted or suspicious well waters previously used for domestic purposes have been abandoned. In Oakfield, especially, where disease had evidently been greatly fostered by the drinking of polluted water, this has been a great boon. Every house there is now supplied with Ryde water. At Elmfield there are still some houses dependent upon superficial wells, the quality of the water of which requires to be carefully watched and is being watched by the Medical Officer of Health. All the other parts of the district are dependent for drinking water upon superficial wells, the quality of the water varying with season and other circumstances of locality, or upon store tanks for rain water, which tanks are with few exceptions improperly placed underground. It is obvious that not only must the quality of the water thus procured be open at times to suspicion, but that its available quantity is dependent upon variations of season.

I have little occasion to animadvert upon the condition of the dwellings of the poor and labouring classes, except in respect of Oakfield. Here I found several of the houses dirty and unwholesome from their filthy surroundings, the yards of some of them being sodden with filth, unpaved, undrained, with pools of filthy water stagnating on them, and loaded with accumulations of dung and filth. Cows, horses, and pigs were being kept in undrained, and uncleansed, and ill-constructed stables or sties. In such a place as Oakfield, which is part of a district that has properly been constituted an Urban Sanitary District, this is a state of things which a Local Board ought not to permit to continue.

The following table shows for recent years the mortality from all causes, and from certain specified diseases after exclusion of persons stated to have come into the district with their fatal illness upon them. I have added columns to show certain cases of sickness which were treated by the Poor Law Medical Officer, or as in-patients or out-patients by the Medical Officer of the Ryde Infirmary.

—	From all Causes.	Deaths (including those from "Fever" in Ryde Infirmary).								Pauper Cases.			
		Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1875 (10 m.)	42	—	—	—	1	—	4	7	—	5	2	—	11 (Ente.)
1876	51	—	—	6	—	—	5	2	—	2	52	—	30 (29 Ente.)
1877	40	—	—	2	—	—	1	1	—	6	A few	—	16 (Ente.)
1878	60	—	—	—	—	6	—	2	—	3	2	1	12 (Ente.)
1879	48	—	—	—	—	—	—	2	—	6	9	—	Several cases.

In the second quarter of 1878 there was a sharp outbreak (about 20 cases) of "Choleraic Diarrhoea" in the village of St. Helens. The Medical Officer of Health inquired into it, but failed to discover its cause. It appears probable that the works of sewerage, and (in part) the improvement of the water supply, especially at Oakfield, have made an impression upon the sickness and mortality from fever, and that further efforts in these directions may be expected to be productive of even better results. The deaths from phthisis are somewhat numerous for an open country district like this, although not equal to the mortality from phthisis in Ryde.

The sanitary administration of the district has erred somewhat in the direction of laxity in dealing with some obvious and long standing nuisances which deserved to have been dealt with summarily, and again in respect of sewer ventilation. Otherwise, there can be no question that the Local Board have been striving to see their way out of the numerous practical difficulties of the work before them. They may fairly derive encouragement from the diminution effected in the fever death-rate of their district. But they have a great deal yet to do in the matter of water supply of the parts badly supplied, in respect of sewer and house-drain ventilation, in the control of building new houses, so as to ensure their wholesomeness and security, and in respect to the scavenging of the populous parts of the district.

The Medical Officer of Health took office in 1875. He is paid five guineas a quarter to perform certain specified duties, among which is reporting to the Local Board quarterly upon the sanitary condition of the district. Although not under this Board's Order, he has striven to carry out the duties prescribed in that Order so far as they are consistent with his agreement with his Board. He receives weekly lists of deaths from the Registrar, fortnightly lists of cases of zymotic diseases in the Poor Law medical practice from the Clerk to the Guardians, and an abundance of information as to these diseases from the Medical Officer of the infirmary and from private practitioners. He says that invariably he inquires immediately into the circumstances of all dangerous infectious illnesses which come thus to his knowledge; and although he does "not go through the formality of giving or requiring certificates respecting disinfections," he satisfies himself as far as he can that necessary steps of disinfection have been taken. I explained to him that it would be more satisfactory to follow the line of proceeding in this respect suggested by the section of the Public Health Act which relates to this subject. He appears to have a full acquaintance with his district, and to have given good advice to his Board from time to time. In an interview I had with the Local Board, I explained to them the practical advantages that would accrue from his being placed under the Order of the Board.

The Inspector of Nuisances is by business a boatman. He is intelligent and apparently painstaking; but he is only engaged to give two days weekly to his work, and for this he is paid a salary of 10s. per week. But really he gives more than these two days, since on complaint or at the request of the Medical Officer of Health, he occasionally visits parts of his district on other days. He is not appointed under the Board's Order; in fact, I understand that he is regarded by the Local Board as a temporary assistant to the Surveyor, and is not appointed permanently. He keeps a proper report book, which, however, does not show the orders given by the Local Board nor the result of the action taken in respect of nuisances. This action appears to be the writing of a letter to the person in fault; followed, if the letter be not attended to, by a statutory notice. The nuisance, if abated, is then lost sight of until it recurs, and then the same course is again pursued. Statutory steps to prevent recurrence, when recurrence is to be anticipated, are not taken. The Inspector does not keep a continuous record book.

There is no isolation hospital provided for the district, nor any public appliances for

the disinfection of infected clothing, &c., nor for any public Mortuary that can be used by the Sanitary Authority for the purposes of the 142nd section of the Public Health Act.

THE URBAN SANITARY DISTRICT OF SANDOWN.

The town of Sandown,—the inhabited part of this district, south of the railway—lies upon the slopes of a low hill, which falls gradually towards the sea at the south-east, and towards a stretch of low marsh land (protected by a sea wall from incursion of the sea), at the north-east. The principal business street runs nearly parallel with the shore, at an elevation of many feet above the sea-level. The other streets are laid out with regularity, and are for the most part of good width, with gardens attached to them. Being chiefly a residential place for persons in good circumstances, and arranged for the reception of visitors in the visiting season of the year, the greater part of the houses are villas, or houses of a middle class. The poor population is mostly concentrated in a low part of the town to the north-east, adjoining the marsh above referred to. The sub-soil on which the greater part of the town stands is clay (gault), but the westerly and upper third of it stands upon sand. The town is scoured, and the sewage is carried to the lowest level near the marsh, where there are subsiding tanks, and where some straining of it is effected, after which it is carried by a long barrel sewer, and discharged into the sea at a long distance from the town. Some of the gradients are very flat, and in these places the sewers have become occasionally partially choked by deposit in them. The total length of sewers is 8,900 yards (not including the outfall sewer), and in this course there are 40 ventilating openings at the manholes and lamp holes; that is to say, one at about every 225 yards. This amount of ventilation is insufficient. In addition, the ventilators are not constructed in the best possible way, being obstructed by dirt boxes, as described in the instance of the Ryde sewers, while the openings into the roadways are not sufficiently large or free. The sewers are not flushed. It is said that all houses are drained into the sewers, except in a very few cases at the outskirts and at Fort lane, where a few cottages on the edge of the marsh are situated at too low a level to be so drained. The surveyor says that he can answer for the proper laying of the drains of the new houses since he has superintended it; but he has had occasion to believe that up to his appointment, a few years ago, they were not laid so carefully as they ought to have been, and that the junctions were often badly made. House drains are not usually ventilated. Where there are no sewers, domestic premises are usually drained into cesspools.

Water-closets (except where premises are not drained into the sewer), are in universal use. In houses of the lower class they are situated out-of-doors, but in the better class of houses indoors. In the former case they are commonly not supplied with water.

The chief water supply is from the mains of the Isle of Wight Water Works Company, the supply given by which is said to be constant, except at the upper parts of the district in the summer time. There are only about 13 houses in the district to which this water is not laid on; but there are a good many wells about the town, still more or less in use. They vary from 20 to 80 feet in depth; one at the Sandown Hotel is very much deeper. Several wells have been closed on account of their pollution, and few of them can be regarded as safe sources of drinking water.

But neither is the public water supply free from suspicion. From time to time complaints have been made of its dirty condition and apparent unfitness for drinking. One such complaint was made to the Medical Officer of Health in March this year, and a letter of his to the Local Board upon the subject lies before me as I write. The account he gives of the sample of the water referred to is that it had a disagreeably smell like sea-weed or shell-fish, that it deposited a copious sediment, part of which consisted of a thick layer of vegetable matter, the fluid above being of a muddy greenish colour, and that the sediment under the microscope presented “cellular” structures of vegetable nature, with floating bodies of animal origin.” Yet the water is believed to be subjected to filtration before being distributed. The value or efficacy of this filtration may be readily judged of.

Further, the source from which this water is taken is the Eastern Yar river, which commences by two streams, the one at Niton and the other near Wroxall, both issuing from the north side of the chalk downs. Between Godshill and Arreton these streams unite in the Yar, which, receiving various contributions of land drainage in its course, passes near Sandown on its way to Brading harbour. I inspected this river in a

great part of its course from Niton and Wroxall downwards, and I found that not only did it at flood times receive the ordinary pollutions from pastured land to which such rivers are subject, but that it received worse and far more dangerous pollutions in its course from domestic sewage and human excrement, little if any pains having been taken by the Company or by the Local Authority (the Rural Sanitary Authority) which has, under the Rivers Pollution Act, power to prevent its pollution by these filthy matters. At Niton, where one branch commences, the stream is the common open sewer of the village, receiving into it there indescribable pollution of all kinds. At Wroxall the other branch receives all the sewage of the place which does not soak into the earth, together with the overflows from privy cesspits all along its course through the village. At Newchurch it receives sewage from pigsties, &c., and at Alverstone, not more than a quarter of a mile above the intake of the company, the privy soil from the railway station falls almost directly into the stream, which is also the natural receptacle for the sewage of the village. Dr. Frankland in 1874 (6th Report of the Rivers' Pollution Commission, p. 391) thus wrote of this water at a time when it was supplied unfiltered to Sandown. "The water is polluted both by sewage and "other animal matters, and is inadequate to the requirements of the district. The "sample taken from the reservoir close to the entrance to the main by which Sandown "is supplied, was much polluted with organic matter, some of which was of animal "origin. This water was quite unfit for all domestic purposes except washing. Its "use for drinking must be attended with great risk to health. Sand filtration would "improve its quality, but it would still be a dangerous water." It is now said to be filtered; but how imperfectly has been already indicated. It still remains a dangerous water, and will continue to be so, while the source from which it is derived is open to receive filth in the way described. The Medical Officer of Health in his annual report for 1877 drew attention to the necessity of guarding against the sewage pollutions of the river, between its source and the intake of the company.

The scavenging of the district is imperfectly performed by workmen employed by the Local Board. The poorer localities are much neglected.

The Local Board has not provided an isolation hospital for cases of dangerous infectious disease, nor means of disinfecting infected bedding or other articles; nor yet a public Mortuary that can be used for the purposes of Section 142 of the Public Health Act.

The following table shows for recent years the mortality from all causes, and from certain specified diseases after exclusion of persons who are stated to have come into the district with their fatal illness upon them, and cases of certain forms of sickness among persons belonging to the district who were treated by the Poor Law Medical Officers in the Ryde Infirmary:—

—	From all Causes.	Deaths.								Cases.			
		Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1875	-	41	—	—	5	2	4	—	2	—	5	?	?
1876	-	42	—	1	1	—	1	—	2	—	3	11	1
1877	-	32	—	4	—	—	3	2	3	—	3	1	—
1878	-	31	—	—	—	—	2	1	3	—	1	—	—
1879	-	31	—	—	—	—	—	—	3	—	5	2	4
													7 (do.)

It is remarkable that whereas the three deaths from fever were registered under one or other of the synonyms for enteric fever, none of the 51 cases of "fever" recorded in the tables appended to the Health Officer's annual reports appear to have been recognised as cases of that disease. I can only suggest one or another of two explanations for this. Either the so-called "fevers," most abundant when scarlatina was passing away, were themselves examples of that disease; or the cases were real instances of enteric fever, but not recorded as such; it is an unhappy custom of some practitioners to keep the word "enteric" or "typhoid," to signify strongly marked and typical cases of that disease. The mortality from phthisis among the permanent resident population of the place is higher than it ought to be.

The Medical Officer of Health, Dr. Jas. Neal, is appointed under the Board's Order, at a salary of 50*l.* per annum. He receives weekly returns of deaths from the Registrar, and immediate information on the registration of a death from infectious disease, and he receives from the clerk to the guardians lists of cases of disease attended by the Poor Law Medical Officer. He knows his district well, and is active in performing the duties of his office. He has on many occasions given judicious advice to the Local Board, and among other things has repeatedly urged them to provide means of public disinfection and an isolation hospital.

The Inspector of Nuisances is also appointed under the Board's Order, at a salary of 30*l.* per annum. He is subject to the direction of the Medical Officer of Health, and makes close systematic inspections of the district, visiting every house and premises. He says that he visits the worst parts of his district frequently. The filthy and unwholesome condition of houses and yards at Fort lane which I observed does not correspond very well with this statement. But this may be owing to the Local Board being content to hear of the temporary abatement of nuisances, and not adopting the method of preventing their recurrence prescribed by the Public Health Act. He keeps a report book, but not a continuous record book.

THE URBAN SANITARY DISTRICT OF SHANKLIN.

The Local Board district of Shanklin, in the registration sub-district of Ryde, lies on the side of a hill, which from the highest elevations in the district (about 200 feet above Ordnance datum), slopes down to the sea, but more steeply near "the chine" on the west side than in the easterly direction. It is all situated in the parish of Shanklin, except a small part called Gatton on the eastern side, which lies in the parish of Brading. The sub-soil for the most part is sand (lower greensand) to a very great depth, but a small part to the west of the chine lies upon the gault. At one part of the town, viz., at Warren Hill (elevation about 100 feet) water is reached at about one foot below the surface of the ground, so that in this part the basements of some houses are wet. At Gatton (a low level) water is reached at a depth of 12 to 14 feet; elsewhere at not less than 20 or 25 feet. At Gatton the labouring and artisan classes reside mostly in streets of small houses. The town in other respects consists of middle class houses and villas, mostly adapted for permanent residents in comfortable circumstances and for visitors in the visiting season of the year. The only important colony of poor residents in the better part of the town is met with in a close court called "Rubstone court."

The district is thoroughly sewered where built upon. There are about six miles of pipe-sewers under the control of the Local Board. They are very insufficiently ventilated by means of 27 ventilators adapted to man-holes and lamp-holes. The gullies provided for road surface water are trapped; there is, therefore, only one ventilator and that is but a small one, provided for about each 390 yards on an average, and such as are provided are not sufficiently free, the shafts being obstructed with dirt boxes suspended beneath the grated openings. The only sewers flushed are the chine and intercepting sewer, and these not properly.

Prior to about four years ago house drains were laid without any supervision by the officers of the Local Board, and, the Surveyor (who was then a builder in the town) has had occasion to know as a fact that many of them were very badly laid and the connexions improperly made. Indeed, generally, the building byelaws of the district (themselves very defective in many important particulars) were universally disregarded. Even now, although one of the byelaws requires houses to be certified by the Surveyor before they are inhabited, no such certificate is ever given, though nowadays the laying of the drains is always inspected by this officer. Ventilation of house drains is neither required nor arranged for on any system. Many house sinks communicate directly with house drains, being merely trapped with a bell trap at the inlet of the sink pipe. A trap at the foot is now required in the case of new houses.

Water-closets are in universal use, but about a fourth of the whole of them in the town are unsupplied with water. Such closets are outside the houses. Of the rest most are supplied with water from cisterns, the remainder by pipes direct from the water mains. In some houses the same cistern supplies the closet and the drinking water. The waste pipe from the cistern is in some cases carried into the soil pipe of the closet or into the closet pan.

The scavenging of the town—removal of domestic refuse—is performed by workmen employed by the Local Board, but not without application for removal. The ashpits

are in some instances far too large, and great accumulations sometimes take place before removal.

For the most part the houses of the poorer and labouring classes are well looked after, but Rubstone court, in the middle of the town, is for its sanitary condition only to be paralleled by that which I have in past years observed in low Irish courts in the Metropolis and large towns. No care or useful supervision seems to have been bestowed upon it.

The water supply of the district is very defective. There are waterworks under the management of the Local Board. The water is derived from tunnels driven into the upper green sand just above the gault of Shanklin down, and it is stored in covered reservoirs. But the quantity at present available from this source is inadequate, and the Local Board has been seeking the best scientific advice with a view to remedying this important deficiency. The supply is as yet an intermittent one, and the inhabitants are exposed to all the dangers to health incident on such a mode of supply. Where there are no cisterns, the inhabitants have often no water at all during the greater part of each 24 hours. I suspect that there is a good deal of waste which might be prevented by the Local Board insisting more firmly than they do upon the observance of their own regulations in this behalf.

About one-third of the houses in the district (including the two principal hotels) are supplied with water from private wells, the usual depth of which is said by the Surveyor to be under 28 feet, some being quite shallow wells. When the permeable nature of the soil is considered, and also the admitted defects in many of the house drains, such well waters must sometimes be dangerous for drinking.

The following table of the mortality and sickness in Shanklin during the last five years is unsatisfactory on account of its imperfection. But it is the best I have been able to construct from the reports of the Medical Officer of Health, and from information supplied by him from his medical relief book.

	From all Causes.	Deaths.									Cases of certain forms of sickness in Pauper practice of the Poor Law Medical Officer.		
		Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1875	-	35	—	1	—	—	2	1	1	—	1	—	10
1876	-	32	—	—	—	—	1	1	1	—	6	1	—
1877	-	32	—	2	(No tables in Annual Report).				—	—	5	—	4
1878	-	40	(No tables in Annual Report).				—	—	—	7	3	—	7
1879	-	46	—	—	—	—	2	—	—	—	5	—	—

As to "fever" the information obtainable is most indefinite. In the Medical Officer of Health's report for 1875 he says, "Shanklin has been remarkably free from zymotic diseases, fevers being represented by two or three isolated cases of typhoid, (one fatal), and a dozen or thereabouts of febricula." In his 1876 report he says, "There have been isolated cases of measles and typhoid fever," one of which I gather was fatal. In his 1877 report he says, "There have been a very few cases (about half-a-dozen) of typhoid fever of the mildest type." In his 1878 report nothing whatever is said about this disease, and nothing again in his report for 1879, but in the statistical tables, subsequently forwarded to the Local Government Board, I find a record of nine cases of fever "of other or doubtful sorts" having occurred in his Poor Law practice in the district. As to the nature or type of these nine cases I can only surmise. There would seem no room for doubt that, whether severe or mild, enteric fever is of only too common occurrence in Shanklin. The deaths from phthisis in the course of the last five years amounted to 24 in a total mortality of 185 from all causes; a proportion of 13 per cent. of all the deaths. The Medical Officer of Health satisfied himself, and has apparently satisfied the Local Board, by attributing this very high mortality from phthisis to the resorting of phthisical visitors to Shanklin "in the hope of arresting the progress of the disease by its healthful sea breezes and mild climate." He nowhere gives any indication of an endeavour to distinguish such fatal cases from the deaths of residents in the place. The Medical Officer of Health is paid a salary of 20*l.* per annum. He is not appointed under the Board's Order. He tells me that at the time of his appointment, in 1873, the then Chairman told him that "he would have nothing to do except on the outbreak of some epidemic, or when required by the

"Local Board to give an opinion." He was given to understand that he was to regard himself simply as a consultant officer. In compliance with this direction, he has in his Reports to his Board, touched lightly on the sanitary faults of the district. Nevertheless he has from time to time given independent advice. But his reports to his Board are extremely meagre, not always accompanied by tables of mortality, and are characterized by a too roseate tinge. He receives regular returns of deaths from the Registrar, and, being Poor Law Medical Officer, is necessarily acquainted with all cases of sickness among paupers in the district; but he only occasionally becomes informed of cases of infectious disease under the care of the private medical practitioners. Nothing is systematically done to apply the provisions of the Public Health Act to the arrest of the spread of infectious diseases, and it has not been thought necessary to provide means of isolation for cases of such disease, or public appliances for disinfection, nor a public Mortuary that can be used for the purpose of the 142nd Section of the Public Health Act.

The Inspector of Nuisances, who is paid a salary of 20*l.* per annum, and is not appointed under the Board's Order, is a house painter and plumber, in business in the town. He says he considers it his duty "to look round three or four times a month to see if he can detect anything that he should report to his Board," and that once a year he makes a house to house inspection, which occupies him about a month. He is in no appointed relations with the Medical Officer of Health. He makes reports to the Local Board upon loose sheets of paper from time to time, not keeping a Report book. On only two occasions since his appointment, in 1875, has he attended to any matter of disinfection of houses or things. All this is a loose way of doing important work; but with it the Local Board appears to have been satisfied.

THE URBAN SANITARY DISTRICT OF VENTNOR.

This district, now occupied almost entirely by streets, &c., forming the town of Ventnor, is situated upon a part of a huge landslip from the chalk hills at the southern part of the island. The sub-soil, therefore, upon which the town stands is of a heterogeneous nature, consisting of chalk, upper green sand (firestone), and gault, so indefinitely arranged in relation to each other that it is often impossible to predicate upon what sort of rock it is on which any particular part of the town rests, or what would be found at any particular depth on digging down into the ground. Generally the town may be described as regularly built in a series of parallel, or nearly parallel, roads, forming terraces on the hill which reaches to an elevation of 650 feet above ordnance datum. These roads are united by steep streets rising obliquely from the lower to the higher levels. For the most part the roadways are comparatively narrow, but the houses are, in all the upper parts of the town, surrounded by gardens, or have gardens in the front or rear or both. The houses occupied by the artisan and labouring classes are mostly near the lower levels. Behind the esplanade is a natural hollow or excavation termed "the chicken pit," where the sub-soil is gault or "blue slipper," as it is locally termed. Houses erected here are much frequented by visitors on account of their protected situation. About this part of the town slips have from time to time taken place, the land cracking, and so altering in level as to occasion the cracking or actual fall of houses. Water is found in the soil nearly everywhere at a depth of a few feet, since an abundance of it flows from the chalk formation behind the town through the material of the landslip to the sea.

There is no complete map of the sewers of the district. The present Surveyor having been newly appointed, and being a stranger to the place, I am indebted for the information I have been able to gather respecting the sewers to the late Surveyor of the Local Board, Mr. Mitchell. He tells me that the town is completely sewer'd, but that the work, having been done piecemeal, was badly designed, and carried out without good supervision in all parts. The sewer'ing is not, to his mind, satisfactory. On examining sewers in various parts of the town from time to time, he has found them silted up, broken or choked. The sewer in the High Street and Mill Street, which is an egg-shaped brick sewer, he describes as defective and worn. There are two iron pipe outfalls into the sea; both are defective, and their mouths are open upon the beach and uncovered by water for 1½ to 2 hours at ordinary ebb tides, and for about 4 hours at spring tides. Stinks are complained of as proceeding from the pipe which is nearest to the pier and esplanade. I understand that Major Tulloch advised the Local Board to discharge all the sewage at the outfall pipe furthest from the pier, and at the position of a stone breakwater erected there, that a loan has been sanctioned, and that the money is in hand for this purpose, but the work as yet has not been undertaken. Up to about

six years ago nothing was done to ventilate the town sewers, but since that time about 43 "Latham" charcoal ventilators have been put in, the total length of sewers being 9,834 yards. No good resulted from this, and, therefore, finding that this mode of ventilation was a failure, and that sewer air still freely entered the houses, Mr. Mitchell took out all the charcoal spirals with which the ventilating shafts were occupied. The ventilation now consists of narrow 6-in. pipes, rising to the surface of the roadway from sewer pipes of from 15 in. to 9 in. diameter, and surmounted, at the surface of the road, by gratings, the openings of which are so narrow that they readily choke up with mud from the roadways. Some that I saw were completely closed up in this way. Thus the sewer ventilation which is believed to be provided is in great measure delusive. The sewers are never flushed. The houses in the district are not all drained into the sewers, some (it is said at the outskirts) still drain into cesspools, either under or close to the houses. Generally speaking, little reliance is to be placed upon the construction of the house drains, the laying of which had not been habitually performed under the supervision of the Local Board's Surveyor. Where Mr. Mitchell has found them choked, as some have been from time to time, he has traced the choking to carelessness in the way in which they had been originally laid. House drains are not as a rule ventilated, and the inlets at sinks within houses are for the most part merely protected by a bell trap. As a result of all this I find, in the reports of recent inspections made by the Medical Officer of Health and the Inspector of Nuisances, the most common complaint to be that of sewer air entering the houses. Personally I heard many complaints of this serious fault, both from residents and from medical men in the town. The same thing was reported to the Local Board by their then surveyor as long ago as 1876; but no efficient steps were taken to remedy the evil.

Water-closets are in almost universal use, and, as the soil pipes are, as a rule, unventilated, sewer air enters houses also through their medium.

There is a Water Company which supplies water to most of the houses in the district, 687 out of a total of 851 houses being thus supplied. The other houses not thus supplied, derive their water from private shallow wells, the water of which, considering the nature of the soil, and the probably imperfect condition of some at least of the sewers and drains, cannot be free from considerable suspicion of dangerous pollution. Some obviously polluted wells have been closed from time to time. There are two sources from which the Water Company derives its water. One of these is the railway tunnel in the chalk hill above and behind the town, and the other some springs in a large reservoir situated beneath the upper part of the Grove road. The water from the tunnel is received into a reservoir near the railway station, and from this a portion is pumped to a small high service reservoir on the downs for the supply of the houses at the highest elevation. The reservoir at the pumping station which receives the tunnel water, and that beneath the Grove road, are both covered. The same main conducts water from both reservoirs to the town for its supply. I was informed by the chairman and manager of the Company that the water from the Grove road reservoir was only used when the supply of tunnel water was not sufficient; and the latter is not adequate to the supply of the town in dry weather. At other times the excess of water from the Grove road reservoir has flowed away by a waste pipe or conduit, into the public sewer. The overflow from the upper reservoir at the pumping station also passed into the same sewer. The overflow from the upper reservoir was imperfectly and unsafely trapped; the trap was out of sight underground, and could not be found and exposed for my inspection until after a short search. The overflow pipe from the lower reservoir was believed to be trapped, but no one could tell me anything about it. On investigation I found that it was wholly untrapped, and that from the time that the overflow was conducted into the sewer, up to the time of my enquiry, a period of several years, there had been a free communication between the town sewers and the reservoir in question, and that therefore the water of this reservoir had been exposed all that time to absorb sewer air conducted to it through the waste pipe. On my pointing out this serious fault to the Local Board, the Company immediately took steps to disconnect the overflow altogether from the sewer. The supply of water to the town generally is not constant, except at night. The water is turned on alternately to the two sides of the town at the lower levels when the water is scarce. When water is abundant, as in rainy seasons, much is always running to waste, which might be stored, if proper storage reservoirs had been provided. There is no sufficient reason why the town should not have the benefit of a constant supply, and the inhabitants should not be satisfied until they get it. The cisternage arrangements are faulty in many cases. Sometimes there is no cistern, and the water-closets are supplied by a pipe direct from the main; in some houses, the same cistern supplies both the closet and the drinking water, and in some I saw the

waste pipe of the cistern connected with the pan of the water-closet. There still remain, therefore, plenty of opportunities for the contamination of the drinking water of the inhabitants with foul and dangerous emanations.

The town appears to be fairly scavenged.

There are some imperfect Building byelaws, but they have been inoperative. There has been no systematic supervision of new buildings, and new houses have not been certified as fit for occupation before being inhabited.

Since there are no tables attached to the reports of the Medical Officer of Health, I have been unable to distinguish in the following table, which I have constructed from the returns sent to him by the registrar, between the deaths of residents and those of visitors. The table shows for five years past the mortality from all causes, and from certain specified diseases.

	From all Causes.	Deaths.									
		Small-Pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Tubercular Meningitis.
1875	- -	101	1 1 1	1 1	2	1 1	2	1 1	1 1	41	3
1876	- -	91	1 1 1	6	1 1 1	1	2	1 1	1 1	21	3 3
1877	- -	105	1 1 1	1	1 1 1	1	4	1 1	1 1	28	7
1878	- -	115	1 1 1	1	1 1 1	2	2	2 2	1	33	7
1879	- -	92	1 1 1	1 1	1 1 1	1	4	1	1 1 1	30	3
											7

There are two striking features in this table. One is the yearly mortality from "fever" and this was enteric fever. The great prevalence of this fever in Ventnor is a matter of notoriety among the medical men practising in the town. It is met with in the best houses in the place, and is rarely, if ever, absent. While I was there I saw one private case, and one convalescent from the disease, who had infected a sister (who died), in the country. I heard also of other cases. There is no doubt whatever about this fact; nor is there any doubt respecting the fact that the disease has been in most instances contracted in the place. The medical men whom I conversed with on the subject are clear about this, and have attributed their cases either to the use of polluted well water, or to the admission of sewer air into the houses—mainly to the latter cause. The case I myself saw was unquestionably related to sewer air. It was in one of the best houses in Ventnor, and parts of the house were scarcely habitable on account of the offensive smell proceeding from the water-closet and drains. Another unrecognised cause has most probably been the pollution of the Company's water by absorption of the sewer air carried directly, as I have already explained, into the reservoir. The only difficulty in admitting this to having been a means of distribution for enteric fever in Ventnor is that we should have expected the disease to have appeared on a larger scale among the inhabitants and visitors in the place. The other striking feature in the table is the enormous fatality from tubercular disease among the young children in the place. Looking through the death returns which the Health Officer lent me, the frequency of the registration of "tubercular meningitis" and "tabes mesenterica" (certified as such by different medical men), caught my attention, and led me to extract the numbers so registered. Compared with the deaths from all causes (even if we allow the total to be enlarged by inclusion of all the deaths of visitors referred to phthisis), this mortality is enormous. During the 10 years, 1868-77, in England, the deaths from hydrocephalus (which in the Registrar-General's return includes chronic hydrocephalus, as well as acute hydrocephalus, or tubercular meningitis) only amounted to 1·47 per cent. of all deaths; and those from tabes mesenterica to 1·42 per cent. In Ventnor during the last five years the deaths from tubercular meningitis alone amounted to about 4·6 per cent. of all the deaths registered (as above), and those from tabes mesenterica to about 2·6 per cent. of all the deaths registered. The cause of this excessive mortality should be thoroughly investigated by the Medical Officer of Health. There is little doubt that by far the greater part of the deaths from phthisis were those of visitors who came with their fatal illnesses upon them. On the other hand, whether the great prevalence of tubercular disease among the native children of the place is in like manner to be ascribed to their tuberculous parentage, or whether it be due to local circumstances favouring the production of consumptive disease, is a problem as yet unsolved; but it is clearly one which demands the closest scrutiny in the interests alike of the town and of visitors, who are largely attracted to it by its reputation for the relief of this very class of maladies.

The Medical Officer of Health is not appointed under the Board's Order. He is paid a salary of 45*l.* per annum. He obtains from the Registrar of Deaths lists of deaths at the end of each quarter, but he says that he receives information immediately on the registration of a death from zymotic disease. Up to the middle of 1877 he was Poor Law Medical Officer, and consequently knew of all cases of sickness among paupers, but since his resignation of that office he has had no systematic information about these cases. He says that private practitioners inform him of any cases of fever that occur in their practices, but not always early. He has not kept a record of cases that have thus come to his knowledge, and can give me no definite information about them. He reports to the Local Board annually, or on special inquiry being made of him. His reports, however, are all meagre and unsatisfactory; they are not accompanied by any attempt to tabulate the mortality or sickness that have occurred in the district, yet they have contented the Local Board. Nothing has been done systematically to arrest the spread of spreading infectious diseases. On one occasion, four years ago, the Medical Officer of Health and the late Surveyor, made an inspection of the whole town, and reported the results to the Local Board, but nothing in the way of systematic effort at amendment came of these reports. Another similar inspection, but of a quite perfunctory nature, had commenced, and was proceeding at long intervals, when I visited the town.

The appointment of Inspector of Nuisances has not been made under the Order of the Board. The office has been attached to that of Collector of the rates and of market dues payable by persons who bring certain articles into the town for sale. These persons the Collector has to look after. The rates are made for four months at a time, and the Collector tells me that his time is fully occupied for three months on each occasion in their collection. Thus there is but little time left for attending to the work appertaining to the office of Inspector of Nuisances. According to that officer's statement, he is supposed to perform these duties "at odd times." Regular systematic inspection of the district at due intervals has never been carried out; nor is unwholesome food looked after.

No Hospital for the isolation of cases of infectious disease has been provided, nor a mortuary, nor yet any public means of disinfection.

THE RURAL SANITARY DISTRICT OF THE ISLE OF WIGHT.

The Rural Sanitary district is very extensive. It takes in the whole of the Isle of Wight, except those small areas which are under the jurisdiction of the Urban Sanitary Authorities. It is nearly as large as the whole county of Rutland, and nearly half the size of the county of Middlesex. It embraces not only a number of agricultural villages and hamlets, but some places of urban character, such as Yarmouth and Brading, and places of semi-urban character, such as Bonchurch and Freshwater, to which visitors largely resort; and also places like Binstead and Gurnard, which are becoming centres of population, and are inevitably destined in the course of a few years to grow into towns. The district thus is an important one. It is also one which calls for much thought in its sanitary administration, not only for the reasons just mentioned, but on account of the manifold difficulties introduced by the varied character of site and soil, especially in their bearing upon the supply of water, and by the varied character of the population in different parts, and their consequent varied wants. It demands much thoughtful administration also on account of its intimate relationship to the several urban sanitary areas about it, the constant free communication of the several populations, and the dependence of the urban populations upon the rural district for some essential necessities of life, such especially as water and milk, both of which are common media for the communication of specific and fatal diseases. The Rural Authority thus have not only in their hands and under their care officially the health of the population and visitors in their own rural district, but actually and to a serious extent, although not so obviously, the health of the urban populations of the island.

The question whether the sanitary administration of the Rural Authority is of a character to ensure this careful protection of the public health in the island, and to what extent the condition of the places immediately under their jurisdiction indicates the exercise of due care in such administration will be most conveniently considered if this report commences by describing the mode in which the district is divided for various purposes:—

1. The island is divided into five registration sub-districts; one, Ryde, is constituted by the eastern end (about one-fourth) of the island; another, Calbourne, by the western end (about one-third) of the island; while the middle section is divided

into three sub-districts, viz., Cowes at the north, Godshill at the south, and Newport between these. The Rural Sanitary District comprises portions of each of these sub-districts.

2. It has been divided by the Rural Sanitary Authority for the purposes of nuisance-inspection into four districts, each with one Inspector ; three of them, viz., Ryde, Godshill, and Calbourn, correspond roughly with the registration sub-districts of the same name, while the fourth corresponds nearly with the combined registration sub-districts of Newport and Cowes, excepting, of course, the urban portions of such sub-districts.
3. It has been divided for medical supervision by nine Medical Officers of Health into nine divisions, which do not correspond, either when taken singly or in pairs, with the registration sub-districts, nor yet with the nuisance inspection districts. This want of correspondence is of serious practical consequence. I will say nothing about the want of correspondence between the Health Officers' districts and those for registration purposes, since it rarely leads to anything more inconvenient than the imposing of some extra labour upon the registrars in picking out from their registers the deaths to be included in the lists which have to be sent to the several health officers, and to occasional errors due to ignorance of the precise boundaries of each of these gentlemen's districts. But the want of correspondence of the Health Officers' districts with the inspectorial districts gives rise to much more important inconvenience and interferes with the proper sanitary administration of nearly the whole rural district. For, on the one hand, each of the Inspectors of Nuisances finds in his area and in relation with him two or more Medical Officers of Health, perhaps with different modes of managing their districts, or making incompatible demands on his services ; and, on the other hand, the several Medical Officers of Health (with certain exceptions) find in charge of the inspection of nuisances in their district two or more Inspectors. As extreme instances I may mention, first, the case of the Inspector of Nuisances of Newport and Northwood, whose area of work includes the whole or some part of the districts of six of the Medical Officers of Health ; and, secondly, the case of the Medical Officer of Health, Dr. Castle, whose district includes parts of the areas assigned to three Inspectors of Nuisances. It is not surprising that with this confusion in the areas assigned to the one and the other officer there should be lack of due relation between the Medical Officer of Health and the Inspector of Nuisances. It is desirable, and the best Inspectors are the foremost to desire it, that Inspectors of Nuisances should take from the Health Officer directions as to lines of systematic action, and should contrive their daily work according to the changing necessities of their districts ; that they should report to him the existence of conditions which they have learned from him to regard as concerned with health ; and that they should act under his advice in procuring amendment in such conditions. But no Inspector can take this view of his course of action, nor can such co-operation with the Health Officer be designed for him by his sanitary authority, if he be in relations with three or four medical officers instead of one. And thus in the Isle of Wight it has happened that each officer, be he Medical Officer of Health or Inspector of Nuisances, has done his work in his own fashion when and how he pleases ; official intercourse between the two classes of officers is of rare occurrence ; and mutual help towards a common sanitary object is still more rare, and the sanitary administration of the district has suffered in consequence.

The way in which the appointment of so large a number as nine Medical Officers of Health, in a district which might be easily superintended by one, has been brought about is this. The Guardians, who are the Rural Sanitary Authority, have thought fit to attach to the duties of Poor Law Medical Officer those of Medical Officer of Health in such part of the district of each Poor Law Medical Officer as is not under the sanitary jurisdiction of an Urban Authority. And as there are nine such officers there have come to be nine Medical Officers of Health. The salaries attached to the office of Medical Officer of Health vary from 40*l.* for the Yarmouth district to 25*l.* for the district of Cowes and for that of Ryde. The total amount paid to the Medical Officers of Health in the aggregate is 290*l.* annually. The reason assigned by the clerk, in conversation with me upon the subject, for this subdivision of the district and distribution of the duties of Medical Officers of Health among the nine Poor Law Officers was that the Guardians considered that, inasmuch as these officers were constantly about their several districts, they must know them more thoroughly and could inspect them more regularly than any one or two men could do who were not thus

daily engaged. No doubt there is a plausibility in this view of things, but the force of the argument has, I cannot but believe, been exaggerated. It goes upon the assumption that a Medical Officer of Health is a superior sort of Inspector of Nuisances: and this is what the Medical Officers of Health have naturally come to be, as the result of the system in vogue. It is not the business of a Medical Officer of Health to hunt about for ordinary nuisances. This is the legitimate work of an Inspector of Nuisances. The Medical Officer of Health should see no obvious nuisances anywhere in his district; and, should he see any not taken in hand already by an Inspector, he should question that Inspector, or, if need be, should move the Sanitary Authority to ascertain why the Inspector has not dealt with such nuisances. The conditions endangering health which require medical experience for their apprehension and medical intelligence for their remedy, are those which it is the legitimate work of the Medical Officer of Health to bring to light and advise upon. It is for him to bring to bear upon these matters that knowledge of disease and its modes of origin which he is presumed to possess. With his wider scientific and technical information he should take broad views of the conditions under his observation, and, while not despising minutiae of detail, should advise on the basis of an experience which he is ever increasing. These advantages are not ensured when the functions of Officer of Health are devolved upon a medical practitioner because he chances to hold an office under the Poor Law. That circumstance may take him more often over some one area, but it brings him into relations with only one of the classes of people who all need his services, and it limits his opportunities of learning from contrasts and differences among various areas. Nor does the Poor Law Medical Officer appointed to be Officer of Health gain much from his personal relations to pauper sickness. Under proper regulations, a Health Officer, not being a Poor Law Medical Officer, would be immediately informed of the occurrence of cases of disease in the Poor Law practice of a Union.

But allowing a certain amount of consideration to the only argument I have heard adduced in favour of the system adopted in the Isle of Wight it is apparent that this system is associated with several serious practical disadvantages there:—

1. The Authority by the adoption of a rule of this nature, have deprived themselves of opportunities of selecting for sanitary work such gentlemen as by their education and former experience are best fitted for its performance. The speciality of the training that profits a Medical Officer of Health appears to have been quite overlooked.
2. Resignation by a Poor Law Medical Officer involves the loss of his services also as a Medical Officer of Health; and this perhaps to the detriment of the sanitary service of the district. The Guardians have this year thus deprived themselves of the services of one if not two of the best of their staff of Health Officers.
3. It seems to be forgotten that the several subdivisions are necessarily more or less mutually inter-dependent for their health conditions: and that to limit the Health Officer's observation and to prevent his taking cognizance of conditions outside his little district, is to detract seriously from his power of usefulness. It is true this remark applies with equal force to the position of Medical Officer of Health in the little urban districts of the island. Let me give an illustration.

The villages of Newbridge and Shalfleet derive their supplies of drinking water from a stream which takes its rise in the village of Calbourne, where it is most seriously and dangerously polluted at its source. Calbourne, where the pollution arises, is in the district of one Health Officer, who has not interfered with these pollutions, inasmuch as he was officially ignorant and perhaps actually ignorant of the fact that the polluted water was drunk lower down the stream although not at Calbourne; while the Health Officer in whose subdivision Newbridge and Shalfleet lie had not concerned himself with Calbourne, and knew nothing, except generally by report, of the state of affairs there.

Another similar illustration.—The stream of the eastern Yar is grossly polluted by sewage at its sources at Niton and Wroxall, both of them in the Godshill medical district or subdivision. The late Health Officer had had no official cognizance of the fact that the water thus polluted furnished the supply for Sandown and some adjoining places outside that Urban district. I believe he did not know the fact at all, regarding it as beyond his business to inquire where these little brooks ran to beyond his own district. On the other hand, the Medical Officer of Health of Sandown and the Medical Officer of Health of the rural district outside Sandown have nothing to do with Niton and Wroxall, and would have seemed to be going beyond their proper limits if they had taken

cognizance of existing conditions there. With such over-subdivision as this infectious disease may spread from one area to another adjoining or even more distant, but the Health Officer of any one area would be baffled in his endeavours to trace out the origin of cases, and to apply effectual remedies at the source of the mischief. And, at the same time, the Guardians themselves come to regard the several sub-divisions of their district as so many separate areas, and to administer the sanitary law in small details, without taking any comprehensive views of the larger requirements of their district.

4. Another disadvantage of the system lies in the diversity of advice tendered by nine Health Officers when dealing with apparently similar questions in their several districts. The reason for the diversity of advice in various cases is not readily perceived by the Authority; so that even when there is good reason for the diversity, it is apt to be construed as a difference of thinking between different officers, to the serious impairment of the influence of them all, and to the confusion of a Board of non-professional persons anxious to do what is best in each case.
5. There is much inequality in the fitness of the nine Health Officers for the posts they fill, and great diversity in the way in which they think it best to work. This is inevitable among men appointed on no other grounds than that they hold another office; but the inconvenience reaches its maximum when each officer finds his health duties to form so small a part of his total business that he has no inducement to study his subject. The advice likely to be tendered by gentlemen thus appointed cannot but be various and confusing; that which is judicious will fail to get its proper recognition; and a general lack of confidence in the Medical Officers' opinions arises.
6. So, too, in methods of performing work. One officer acts as he says as his own Inspector of Nuisances; and in this way, doubtless, does a great deal of good that that officer might do, but little else. Another reports nuisances to the Authority and asks for their reference by the Authority to the Inspector of Nuisances; and as this officer acts independently of him, he knows nothing of what is done in the several cases thereafter. One having once reported and advised considers his duty at an end; another reports over and over again when his advice is not acted upon, and finally in his annual reports holds up to the view of the Authority their neglect of his advice. There is a want of uniformity and system here which cannot fail to be injurious to the service.

To sum up the outcome of the system of nine Medical Officers of Health as it is to be observed in this Rural District:—Without an exception, the Medical Officers of Health have degenerated into little more than Inspectors of Nuisances. In some instances they are really sub-Inspectors of Nuisances, their time being occupied in the discovery of flagrantly offensive conditions, and then in reporting them directly to the Authority, or calling the attention of the Inspector of Nuisances to them. Some of the annual reports are good, others are most meagre. Yet all these Medical Officers of Health are appointed under the Order of the Local Government Board, and have directions as to the points upon which they are to report.

Infectious diseases have not been systematically dealt with, and the provisions of the Public Health Act relating to them have been generally ignored where cases of such diseases have occurred in private practice. This has been inevitable, seeing that the Health Officers have found themselves in a position of delicacy to each other and to other medical practitioners; and they have feared to be intrusive if they sought information from private practitioners. One of the arguments in favour of concentration of medical sanitary charge in the hands of one Medical Officer of Health, not in private practice, is that, under such circumstances, he feels himself more free to exercise his duties, and that private practitioners are found to be desirous spontaneously to seek his assistance.

The Inspectors of Nuisances are also appointed under Order of the Local Government Board. Three of them are paid 25*l.* per annum each, and one is paid 35*l.* per annum. Each is also Vaccination Officer. They are supposed to inspect their districts systematically, but as they rely upon this part of their work being done for them by the Medical Officers of Health, the systematic inspection is loosely performed. Thus many flagrant nuisances are to be found in all parts of the district, nuisances which the Inspector must have seen had he visited his district properly, but which he did not see, or at any rate had not reported to the Authority. Some of the Inspectors have indeed performed their work better than others. But, except occasionally, when the instinct of co-operation between persons having a common interest has prevailed, little

communication has been held between the Health Officers and Inspectors, and then they have made inspections together. Sanitary work can never be properly carried on without frequent and systematic communication of this sort. The Inspectors keep report books, but no continuous record books. When required to perform or superintend disinfection, they have followed, I understand, the directions of the Medical Officer of Health, and in other respects have, generally, been attentive to such instructions as they received.

The Rural Authority, which is the Board of Guardians (with a few exceptions) of the Isle of Wight Union, consists of 53 elected and 20 ex-officio members. Their meetings take place fortnightly. The Guardians meet as the Rural Sanitary Authority after all their business as Guardians of the Poor has been completed. They meet for Poor Law business at 10.30 a.m., and this business usually occupies them for about four hours. The average time subsequently occupied by Sanitary business is, I am informed, on an average $1\frac{1}{2}$ hours, but sometimes it is a much longer time. The Guardians who happen to come to the Poor Law sitting are those who subsequently transact the sanitary business. It is not customary for members who have not come to the former to come for attendance at the latter. The ex-officio Guardians, with the exception of about four of them, who are pretty regular attendants, very rarely come to the sanitary meetings. At these meetings the entries made by the Medical Officers of Health in their journals are read, and also the reports made by the Inspectors of Nuisances in their report books; and the statements thus read are initialed by the chairman, or directions are given to the Inspectors upon them. Now, no doubt it is in a certain sense convenient to the members and to the clerk that the sanitary business should thus be appended to the Poor Law business of the Board; but it is only natural that interest should flag after four hours' continuous work, with its attendant fatigue, and that a disposition should be felt on the part of all concerned to shorten as far as possible the sittings as the Sanitary Authority. That this feeling does operate to some extent is shown by the habitual departure of a number of those who have attended the guardian meeting, as soon as the sanitary business comes on.

This feeling indicates itself in another way, namely, by the apparent tendency of the Authority to delegate its functions of inquiry in any important local matter to parochial committees, such committees consisting of members of the Authority, together with other persons qualified so to act. Such a proceeding is perfectly legal, and in accordance with the 202nd section of the Public Health Act. But the exercise of this power of delegation to a parochial committee is liable to be carried to excess, and if not carefully guarded may lead to a virtual reinstating, under shadow of the above section, of much the same sort of vestry administration which was in force before the Public Health Act of 1872 was passed: while the Authority as a whole, losing their proper interest in principles of action, may come to think they have done their work when they have accepted as matter of course the conclusions of their local committees. This is especially likely to be the case when the questions referred to a parochial committee involve the expenditure of money.

I will illustrate what I mean by two or three recent instances in this Union. And my first example shall be an instance where a parochial committee was usefully engaged on the study of details and in overcoming apparent obstacles. The question of the necessity for a water supply for Wootton village was brought under the notice of the Authority by their Medical Officer of Health, Mr. Tuttiett, in his annual report for 1878 (and I believe also prior to this), and he suggested that a supply might be obtained from springs running to waste close by. The subject was referred to a parochial committee. Various difficulties arose in respect to the Medical Officer's suggestion, and the end of the affair was that additional wells were dug, and a plentiful supply of water was obtained, which settled the business for the present at least. The result in this instance was satisfactory, and expense to the ratepayers was properly saved.

The next instance is of a different class. Some four years ago the deficiency of water in a place called Tinker's Lane was brought prominently under the notice of the Authority, and the subject was referred to a parochial committee. The deficiency was only too obvious, many of the poor cottagers there getting their water from a polluted and muddy stream of water at the bottom of the lane, the only available source of supply. Nothing in the way of efficient action resulting from the appointment of the Committee, Dr. Wm. Hoffmeister, the Medical Officer of Health, repeated his complaint, and a letter was written by the Local Government Board to the Authority upon the subject. This letter was referred to the parochial committee. Nothing came of all this until January 1878, when it was discovered that a supply of water was available in the neighbourhood, and in May 1878 a tender was accepted for the erection of a reservoir to store this water, and to lay the necessary supply pipes. In August 1878 a

vestry meeting, called for the purpose, sent in a protest against the scheme, and three weeks later the parochial committee came to the following resolution : "That in consequence of an Act of Parliament being passed, entitled the 'Public Health Water Act, 1878,' making it compulsory on the owners of property to supply their houses with water, which will come into force on the 25th March 1879, it is not desirable to proceed with any further steps to supply Tinker's Lane with water until after that date." In this resolution it would appear the Rural Authority coincided, although they had been informed by circular letter from the Local Government Board that the passing of the Act did not relieve Rural Authorities of the duties imposed on them by the Public Health Act to provide their districts with a supply of water. From that time to this nothing further has been done to remedy the deficiency either under the Public Health Act or the Public Health (Water) Act.

Another illustration of administrative miscarriage resulting from delegation of an important question to a parochial committee is afforded by the case of Carisbrooke (at the outskirts of Newport) the cesspool nuisances of which place have been for many years notorious. The subject was in the hands of a parochial committee for six years. The steps consisted in the admission of the evil and recognition of the only effectual remedy; consultation with an eminent engineer, Mr. Bailey Denton, who suggested two alternative proceedings, either of them practicable; a vestry meeting of the inhabitants which protested against any costly scheme of drainage; the immediate abandonment of the project; and, finally, the construction of additional cesspools, which the Authority has not undertaken to empty, and has neglected ever since. The complete history of the transaction is upon my notes.

I now proceed to consider certain points in the condition of the Rural district.

Certain populous parts of the rural district have been sewered by the Authority, namely, Yarmouth, Bembridge, and Haylands near Ryde. At Yarmouth the sewerage was done defectively, and evil results have followed, which have been made the subject of complaint to the Local Government Board. The ventilation is defective; and the manholes having been so constructed as to become sinks for sewage deposit, and never having been cleaned or flushed, stinks from the untrapped street gullies are loudly complained of. In like manner at Bembridge ventilators are interfered with by dirt boxes. At this place, where house connexions are supposed to have been made they have often consisted of the overflows of old cesspools conducted into the sewers. Afterwards the dirt boxes have been allowed to become choked up with filth, ventilating openings have been permitted to be closed by the inhabitants in the endeavour to protect themselves against the stinks that must under such conditions and in the absence of due flushing arise from them, and generally the sewers once put in have been wholly neglected since. At Haylands matters are little better; there is the same error in construction of the ventilators, similar neglects, and similar complaints of stink. The Authority is now about to sewer the town of Brading, and they will do well to recognise the errors that have been committed at Yarmouth, and to avoid them in their new operations. The sewage nuisances of Wroxall, which drain into one of the tributaries of the eastern Yar, have been referred to a parochial committee. Where there are no sewers cesspool nuisances abound: where the soil is permeable the contents of cesspools and other discharges of liquid filth soak into wells of drinking water, and where it is not permeable the cesspools often overflow into the roadways or into ditches which they render offensive, or into streams of water used for drinking. Such conditions are very common in some parts of the island, not only creating nuisances complained of by the inhabitants, but putting the public health into serious jeopardy. One of the worst of the nuisances thus created and long neglected is at a place known as Gunville Lane, near Newport. Yet this and other similar nuisances have been reported and commented upon from time to time by the Medical Officers of Health. With respect to growing places like Freshwater and Gurnard, where the nuclei of new towns have clearly been established, the future of such places does not appear to have been recognised by the Authority. By permitting the establishment of the cesspool system in such localities, instead of providing for them due sewerage while in a comparatively infant condition, the Guardians are laying up for themselves a store of troublesome and expensive work for future years, and difficulties similar to those which they are now encountering at Carisbrooke.

The water used for drinking purposes in the rural district is almost universally derived from one of the following sources, viz., wells, rainwater tanks, streams, pools, or ponds.

(a.) As to the wells. Some of them in the chalk districts are deep, and the supply is good, and only open to such suspicions of occasional pollution by soakage from farmyard sewage, &c. as renders them the proper subjects of careful supervision.

But in the alluvial districts the wells are superficial, some extremely shallow. The water flows into them merely by soakage from the superficial earth, and is often so contaminated as to be unwholesome or absolutely undrinkable. In dry seasons even this bad water may be deficient in quantity, and the people may thus have to resort to pools and ponds or to some stream. In illustration of this form of bad water supply, I may refer to the town of Brading (where enteric fever has been traced to well pollution) and, amongst other places to Horsebridge Hill and Gunville Lane, both near Newport. Freshwater is supplied with water from surface wells. One of these wells is most grossly polluted in the way I have mentioned, and the rest are liable to similar pollution. The importance of the place, and the fact that the danger from this source has already been brought to the notice of the Local Authority by the Medical Officer of Health, led me to take for analysis two samples of well-water from opposite ends of the village. One of the samples, No. 1, was from a well the water of which is now regarded as drinkable, but which a short time ago was greatly and offensively polluted by soakage from a cesspool a few yards distant from it, to which soakage it is still liable. The other sample is from a well in constant use, near which are several cesspools. The result of these analyses is given in the appendix to this report. It confirms the opinion given by the Medical Officer of Health; and is of interest as showing how waters liable at any time to become dangerous to the health of persons drinking them, may give to the chemist little indication of unwholesome pollution where particular samples are taken.

- (b.) In some parts rain water is stored in tanks for drinking purposes. But mostly these tanks are improperly situated underground, where they are not readily accessible for periodical cleaning, and the water consequently is apt to become undrinkable.
- (c.) As a striking illustration of the use of unwholesome stream water I may refer to the villages of Newbridge and Shalfleet. These villages are situated on a stream which takes its origin from some springs close to Westover House at Calbourne, and flows northwards through these villages into Newtown Bay. About 50 or 60 families at Newbridge and all the inhabitants of Shalfleet get their drinking water from this stream, and in dry seasons of the year people for two miles or more round send to Shalfleet for this water, as the nearest supply available to them. The following are the sources of pollution to which I found this water exposed. The water from the springs first entered a pond on the grounds of Westover House, into which pond the sewage—including the water-closet matters—from that house was discharged. A few yards below the pond the stream received the sewage of a row of cottages at Calbourne, which sewage included matters leaking out of privy cesspools. Opposite these cottages the stream is in the summer time dammed up to form a pool for washing sheep preparatory to shearing them, and the water, thus fouled by the sheep and by the poisonous (arsenical) preparations used in the washing, flows on for about a mile to the village of Newbridge, of which village the stream is here the natural drainage outfall. At Shalfleet, about two miles lower down, more sewage and privy excrement enters the stream close to where water is taken by the inhabitants, and only a few yards above the place where the water is taken by persons who fetch it from a distance. This condition of things has been going on for many years, and no effort has been made to improve it, notwithstanding that in respect of the village of Newbridge it had been brought to the knowledge of the Sanitary Authority by the late Medical Officer of Health for the Yarmouth sub-division, and notwithstanding that the Guardians are the authority charged with the protection of the stream under the Rivers Pollution Act. At Brixton again, the water of a stream grossly polluted with sewage matter is the only drinking water available to some of the cottagers. At Shortwell also stream water similarly, but less obviously, polluted is commonly drunk.
- (d.) The part of the island where pond or pool water is most resorted to is that part which lies between Parkhurst Forest and Newtown. There is a great deficiency of water here. At Porchfield and at Locks Green I found cottagers resorting to the little pools of stagnant water left in otherwise dry or nearly dry water-courses. Some of these people told me they had sometimes to fetch water from a distance of two miles. The stream at Shalfleet was the place usually resorted to.

In some few places close to Urban districts water has, by arrangement, been provided by the Sanitary Authority from the waterworks established in those districts.

This is the case in Haylands, near Ryde, and at a small property forming part of the village of Lake near Sandown. Bonchurch and part of St. Lawrence are also similarly supplied from Ventnor. Some houses in Carisbrooke are supplied from the Newport waterworks. But even where this sort of supply is available I found instances of houses, whose only supply was from some polluted well. Absolute drought of water in some places, and its very bad or dangerous quality in other places, have been frequently reported to the Sanitary Authority by the Medical Officers of Health.

In the course of my inspection I met with some very unwholesome cottages in the rural parts of the island, greatly overcrowded, with scarcely any means of ventilation of the bedrooms, dirty, and so dilapidated that the preservation of anything approaching cleanliness was an impossibility. Some of the worst of these were in Tinkers Lane, in the Northwood district. One case of overcrowding in the Overton district was being dealt with in a very dilatory manner. The rest had been let alone. Privy and drainage nuisances about cottages were discernible almost anywhere, and indicated much inefficiency of every-day nuisance inspection.

Since March in last year it has devolved on the Guardians to carry out the provisions of the Public Health (Water) Act, 1878. In respect of new houses to which section six of that Act applies they have done so, and they have permitted no new house to be occupied until they have been satisfied that a proper water supply has been provided. But they have not carried out section seven, which makes it their duty to have periodical inspections made to ascertain the condition of the water supply within their district. To this omission and to the consequent failure to exercise the powers of the Act, and of the Public Health Act, 1875, must be ascribed a great part of the defective condition of the rural district in respect of its water supply.

With the exception of the infectious diseases hospital at the workhouse at Newport, which is only available for paupers, and (necessarily) for such of these only as reside at a reasonable distance from the hospital, no provision has been made for the isolation of cases of dangerous infectious diseases.

The following table shows for the years 1878 and 1879 the mortality from all causes and from certain specified diseases in the Rural Sanitary District and its several Medical Officers of Health divisions, after exclusion of persons who are stated to have come into the district with their fatal illnesses upon them; it shows also the cases of certain forms of sickness which were treated in the district by the Poor Law Medical Officers.

Medical Sub-divisions.	Deaths.										Cases in Pauper Practice.		
	From all Causes.	Small-pox.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	"Fever."	Diarrhoea.	Cholera.	Phthisis.	Scarlatina.	Diphtheria.	"Fever."
1878.													
Arreton - -	26	—	1	1	—	—	—	1	—	2	30	—	1
Carisbrooke - -	129	—	—	—	—	7	3	4	—	—	1	—	3
Whippingham - -	15	—	2	—	1	—	—	—	—	—	—	1	—
Ryde - - -	52	—	—	—	1	2	2	1	—	7	—	6	—
Godshill - - -	60	—	—	—	—	—	2	3	—	7	—	2	4
Yarmouth - - -	54	—	2	—	—	—	—	—	—	3	2	—	1
Brading - - -	56	—	—	—	1	1	2	6	—	5	14	—	29
Cowes - - -	28	—	—	—	—	5	—	1	—	—	—	—	—
Shorwell - - -	28	—	—	—	—	—	2	—	—	7	—	—	6
Total - - -	448	—	5	1	3	15	11	16	—	51	47	9	44
1879.													
Arreton - -	26	—	—	—	—	—	2	—	—	1	3	—	9
Carisbrooke - -	126	—	—	—	—	—	4	1	—	16	—	—	3
Whippingham - -	13	—	—	—	—	—	—	—	—	—	—	—	3
Ryde - - -	27	—	—	—	—	—	—	—	—	—	—	—	—
Godshill - - -	52	—	—	—	—	—	1	2	—	—	4	—	—
Yarmouth - - -	58	—	—	—	—	2	—	—	—	—	10	—	—
Brading - - -	45	—	—	—	—	—	1	3	—	—	4	—	17
Cowes - - -	19	—	—	—	—	—	—	1	—	—	1	—	4
Shorwell - - -	38	—	—	—	—	—	1	1	—	5	—	—	10
Total - - -	404	—	—	—	1	5	10	6	—	43	3	—	46

* Two cases of scarlatina in this district were treated as out-patients of the Ryde Infirmary.

† Four cases of enteric fever in this district were treated as out-patients of the Ryde Infirmary, and four other cases (from Haylands) were treated as in-patients.

‡ One case of enteric fever from Haylands was treated in the Ryde Infirmary.

This table shows, amongst other things, that "fever," either distinctly "enteric" or of a mild and doubtful character (most probably also enteric), is a by no means uncommon disease in those parts of the island which are not included within urban districts. One death in every 40 was in each of the last two years referred to this disease, and from 44 to 46 cases of fever occurred each year in the Poor Law Medical practice alone. Nor can this cause surprise when the nature and frequency of nuisances and the unwholesomeness of much of the water supply are taken into consideration. It is quite possible that in some instances the disease might have been contracted in one or other of the urban districts; but this, if so, may be regarded as compensated by the equal probability, that cases of fever in the urban districts might have originated directly or indirectly from the rural district. One of the evil results of the splitting up of the sanitary jurisdiction of the island, and of placing it in the hands of no fewer than nine Sanitary Authorities, one of them with as many as nine Medical Officers of Health is to obscure this important feature in the causation of diseases. The great prevalence of phthisis in the rural district, as indicated by 11·4 per cent. of all the deaths of residents in 1878, and 10·6 of all the deaths in 1879 being due to this disease, does not appear to have received adequate study. How far it may be due to inheritance from the many consumptive outsiders who have used the island cannot be said. But whatever the way in which the native population have come by their tendency to consumption, it is of great importance for the Sanitary Authority to recognise the power of sanitary measures, applied to the soil on which people dwell and to the houses in which they are lodged, to counteract this tendency; more exact attention than heretofore should be given to such matters as the dampness and bad ventilation of houses, and the Local Authority would do well to obtain powers to regulate by proper byelaws the construction of new houses, so as to secure their wholesomeness as habitations.

EDWARD BALLARD.

December, 1880.

RECOMMENDATIONS.

A. WITH RESPECT TO THE OFFICE AND DUTIES OF MEDICAL OFFICER OF HEALTH.

The arrangement under which, in the rural sanitary district, each District Medical Officer has been appointed Medical Officer of Health for his Poor Law division, and, in the urban districts, private medical practitioners have been separately appointed to the post, is attended with disadvantages which will be apparent from what has been stated in the body of this report. It is of great importance that the services of a skilled Medical Officer of Health, not occupied in private practice, should be available for each district, and in order to provide an adequate salary it is desirable that a combination of all the Sanitary Authorities in the Island should be made for the appointment of a single officer. The area and population are large, but not larger than those of many existing combined districts where the appointment of a single Medical Officer of Health has been attended with excellent results ; and there seems no reason to doubt that an officer living in a central position, such as Newport, and devoting his whole time to sanitary work, would be able to exercise proper supervision over the whole Island.

The Officer of Health should perform strictly the duties specified in the Local Government Board's Orders of March 1880. He should be placed in such relations with the Inspectors of Nuisances, and should so organise their work, as to ensure his being kept acquainted in this way, as well as by his own periodical inspections, with the sanitary circumstances of the several districts ; and he should advise the Sanitary Authorities from time to time as to the measures necessary for the protection of the public health in their districts.

B. WITH RESPECT TO THE OFFICE AND DUTIES OF INSPECTOR OF NUISANCES.

Whether appointed or not under the order of the Local Government Board, these officers should be required by the several Authorities to carry out in detail all the duties prescribed for Officers appointed under the Board's order. Especially they should be required to inspect all parts of their districts periodically and systematically, and invariably to report to the Authority all obvious nuisances they meet with, or nuisances and conditions to which their attention may have been called by the Authority or by the Medical Officer of Health, or by complaint made to them. Upon receiving the direction of the Authority, they should enter such direction in the report book, carrying it out, and subsequently report the result. It would in all districts greatly conduce to efficiency of administration if the Inspectors of Nuisances were directly subordinated to the Medical Officer of Health, as respects both the order and mode of performing their duties.

When appointing an Inspector of Nuisances, each Authority should bear in mind the multifarious duties attaching to the office, and should take care that any additional offices or functions entrusted to him shall not be such as to hinder him from the due execution of all his duties as Inspector of Nuisances, and especially that they shall not be of such a nature or of such importance as to interfere in any way with the systematic inspection of his district, or with any special or urgent work which he may have to perform under the directions of the Medical Officer of Health in the event of the spread of disease.

In the rural sanitary district four Inspectors of Nuisances should be appointed, one for the rural portion of each registration sub-district. Each should be required to devote his entire time to the duties of his office, and to reside at some central place in his district.

C. WITH RESPECT TO THE SANITARY CONDITION OF THE URBAN DISTRICTS.

1. All public sewers should be freely ventilated. The ventilators should not in any case be less than 100 yards apart, and their construction should be such as to do away with the necessity for dirt boxes, which obstruct ventilation. Sewers should be

periodically flushed. Where brick drains are decayed or inefficient they should be replaced by pipe drains.

2. Every opportunity that presents itself should be taken for procuring house-drains to be trapped and ventilated, and sink-pipes to be disconnected from them so as to prevent the access of sewer air to the interior of dwellings.

3. The water supply should, where necessary, be extended, and should be given by preference on the constant system. Water should be supplied to closets, not directly from the main, but through the intervention of flushing cisterns.

[In respect of the subject-matter of the above recommendations, Mr. Rawlinson's "Suggestions as to Plans for Main Sewerage, Drainage, Water Supply," &c., should be consulted.]

4. Wells should be from time to time examined, and those found to furnish polluted water should be dealt with under section 70 of the Public Health Act. The powers of section 62 of that Act, with reference expressly to the supply of water, under certain circumstances, to houses without a proper supply, should be duly exercised.

5. New byelaws as to streets and buildings, based on the model series issued by the Local Government Board, should be adopted in each district where they have not already been adopted, and should be carried into effect in such a manner as to secure the dryness, good ventilation, and general wholesomeness, of the houses to be thenceforth erected.

6. The keeping of animals and the business of slaughtering should be regulated strictly by byelaws based upon the model issued by the Local Government Board.

7. Not only should the removal of nuisances be seen to, but steps should be taken under the 95th section of the Public Health Act to prevent their recurrence. It may be convenient to enforce the periodical removal of manure, &c., under the powers of section 50.

8. The scavenging and refuse removal of each district should be undertaken by the Sanitary Authority, who should take care that it is carried out effectually, at frequent intervals.

9. Special attention should be bestowed upon the courts and houses occupied by the poorer classes. Yards which are imperfectly paved and dirty; and dwellings which are in an unwholesome condition through want of lime-washing, defective ventilation, dampness, dilapidation, or other causes, should be dealt with under the Public Health Act, sections 46 and 97.

10. In order to arrest the progress of dangerous infectious diseases, it is of the first importance that each Sanitary Authority should have some means of isolating sick persons who cannot be effectually isolated in their own houses, and with this object the powers conferred by section 131 of the Public Health Act should be exercised. It is also desirable that a disinfecting apparatus and a public mortuary should be available for each district, and that the several Authorities should strictly carry out the provisions of the Act with regard to infected persons and things. Each Authority should invariably require a certificate under section 128 before houses or rooms in which infectious diseases have occurred are again let for hire.

In addition to the above general recommendations, the following special recommendations apply to the respective urban districts :—

WEST COWES URBAN SANITARY DISTRICT.

- a. In order that the Local Board may be properly informed with respect to the sewers under their control, and thus be in a position to deal with them, it is very desirable that a complete plan of them should be made, and that definite information respecting their construction and condition should be put upon record.
- b. The sewage, now discharged upon the mud on the shore from the public sewers and private drains, should be intercepted and discharged at a proper outfall into the sea at such a place and with such precautions as that the discharge shall not create a nuisance. The Local Board should consult some competent engineer with a view to this improvement, and also as to the best means of preventing flooding of the lower part of the town with sewage.

EAST COWES URBAN SANITARY DISTRICT.

The Local Board should actively proceed to carry out their proposed improvements and extensions of their system of sewers; and, as the new sewers are put in, should see that all private premises in their course are drained into them, and that the cesspools on such premises are filled in.

BOROUGH OF NEWPORT.

- a. In addition to the parts of the borough newly included within it, the part of the old town of Newport which is not now sewer'd should be sewer'd.
- b. The Sanitary Authority should take effectual steps to free the estuary of the Medina, where it lies within the borough, from sewage pollutions, and the deposit of unwholesome mud, by intercepting sewage from it and increasing the scour at ebb tides. With this object in view, and also with a view to obviate the occasional flooding of the lowest part of the town, they should consult some competent, experienced engineer.

BOROUGH OF RYDE.

The attention of the Authority should be directed to the question of the sewage outfalls with a view to their considering, with engineering advice, the advisability of discharging the sewage of the whole of the town into the sea by the eastern outfall.

ST. HELEN'S URBAN SANITARY DISTRICT.

The Local Board should seek advice from a competent engineer as to improvement capable of being made in the water supply of Sea View, St. Helen's Green, and Spring Vale, with a view to furnishing these places, and other places where the drinking water is liable to be scanty or unwholesome, with a wholesome public supply. Where it is necessary to store rain water in tanks, these tanks should be above ground, where they can be readily examined and periodically cleansed.

SANDOWN URBAN SANITARY DISTRICT.

- a. The unwholesome condition of the houses and premises in and about Fort Lane should receive early attention, and there, as well as in any other places which are at too low a level to be sewer'd, other appropriate means to prevent the occurrence of nuisances from excrement and sewage should be provided. In relation to this the Local Authority may usefully consult the Report made to the Local Government Board upon Excrement Nuisances.
- b. The Local Board shall take the necessary measures to procure from the Water Company that supplies the district a more wholesome and trustworthy supply of water than is now given by them. The Rural Sanitary Authority should be moved to take steps under the Rivers Pollution Prevention Act for preventing the dangerous pollutions of the Yar, from which the present supply is derived, and the Water Company should be moved to improve the filtration at the works, and to cause the supply mains throughout the district to be duly cleansed from deposit of filth. Private wells used for the supply of drinking water should be placed under strict supervision, and, as occasion requires, dealt with under sect. 70 of the Public Health Act.

SHANKLIN URBAN SANITARY DISTRICT.

The Local Board should at once proceed to determine upon a plan for obtaining a more ample supply of water. When doing this, they should strive to render the supply that they give a constant one.

VENTNOR URBAN SANITARY DISTRICT.

- a. The Local Board should cause a careful and complete examination of their sewers to be made by a competent engineer with a view to ascertain faults in their

arrangement or construction, and should at once make such amendments in either of these respects as may, on his report, appear to be requisite.

b. The recommendation of Major Tulloch, with respect to the outfall of the sewers, for the carrying out of which recommendation a loan has been already sanctioned, should be carried into effect at once.

WITH RESPECT TO THE SANITARY CONDITION OF THE RURAL SANITARY DISTRICT OF THE ISLE OF WIGHT.

- a. The Sanitary Authority should deal with obvious nuisances much more actively than they have dealt with them hitherto, and overcrowding shall be repressed. When houses are so dilapidated that it is impracticable to keep them clean, measures should be taken to procure their repair or to close them if they are unfit for habitation.
- b. Where it is apparent that in any villages excrement and drainage nuisances can be satisfactorily abated and their recurrence be certainly prevented only by the provision of sewerage, the Authority should make this provision and deal effectually with the sewage. They should also take measures to prevent the pollution of streams by sewage.
- c. When sewerage has been already provided, means should be adopted for the free ventilation and periodical flushing of the sewers. The various faults of construction and management pointed out in the body of this report should be remedied.
- d. The water supply of the district should receive special attention, polluted wells should be closed, and action with regard to proper supplies should be taken under the Public Health (Water) Act or the Public Health Act, 1875, as circumstances require.

[With regard to the subject-matter of the recommendations (b.), (c.), and (d.) Mr. Rawlinson's " Suggestions as to Plans for Main Sewerage, Drainage, Water Supply, &c.," should be consulted.]

- e. In respect of those parishes where much building is taking place, the Sanitary Authorities should apply to the Board for urban powers to enable them to make byelaws regulating the construction of new houses, so as to ensure their being so built as to be wholesome and fit for habitation.
- f. It is very desirable that means should be available for the isolation of persons attacked with dangerous infectious disease, who cannot be effectually isolated at their own homes. On this matter the Office Memorandum on " Local arrangements relating to Infectious Disease " should be consulted. The provisions of the Public Health Act with regard to infected persons and things should be carried out, and the Authority should invariably require a certificate under section 128, before houses or rooms in which infectious disease has occurred are again let for hire.

D.—WITH RESPECT TO THE ADMINISTRATION OF THE RURAL SANITARY AUTHORITY.

Considering the importance of the sanitary functions of the Authority to the health and prosperity of the whole Island, and the danger, if those functions continue to be neglected, of the spread of epidemics which will be costly both in life and in money, it is desirable that more attention should be devoted to these sanitary functions than has been possible at the brief fortnightly meetings hitherto held after the meeting of the Guardians for Poor Law purposes. Unless the Authority are prepared to have special weekly meetings for sanitary business, they should take advantage of section 201 of the Public Health Act, and annually delegate their powers to a committee of their own members, selecting for the purpose such as are most likely to attend regularly. A sanitary committee so constituted might meet fortnightly, or even more frequently, and might be specially summoned at any time in case of emergency.

APPENDIX.

REPORT ON TWO SAMPLES OF WATER RECEIVED FROM DR. BALLARD, JUNE 15, 1880.

Samples contained in two Winchester quart bottles, each bottle stoppered, and stoppers tied over with leather secured by seals, seals unbroken, bottles labelled—

Sample I. "No. 1, well at Easton, Freshwater, June 1, 1880, private well.
" II. "No. 2, Freshwater Bay Road, private well, June 12, 1880."

No. I. The water is clear and almost colourless, tasteless, and inodorous. It is hard and remains somewhat hard even after boiling. It is fairly pure as far as organic pollution is concerned, as evidenced by the small proportion of oxygen absorbed, the minute trace of ammonia present, and the very moderate proportion of albuminoid ammonia yielded. On the other hand, there is a very large amount of nitric acid, indicating considerable contamination by sewage or surface drainage. At present the organic matters originally contained in these are very completely oxidised, and the water is, in consequence, fairly pure. This oxidation may, however, not always be as complete in which case the water might become extremely impure. Much will depend on the surroundings of the well, more particularly as regards the nearness or otherwise of the polluting source, for should this be at some distance the water will probably always be pure. The water also contains a minute trace of lead, and this in so hard a water is a somewhat suspicious circumstance.

No. II. The water is slightly turbid, and on standing yields a small amount of deposit, consisting, however, of oxide of iron and carbonate of lime chiefly. In other respects it greatly resembles No. 1; like this it is, at present, pure as far as regards the actual presence of organic matter, but like it it contains much nitric acid, and may therefore, more particularly in case the polluting source should be found near at hand, be impure at times.

The analytical details are given in the table annexed.

					Sample I.	Sample II.	
Appearance	-	-	-	-	Clear.	Slightly turbid.	
Colour	-	-	-	-	Pale greenish.	Pale greenish brown.	
Taste	-	-	-	-	Tasteless.	Tasteless.	
Smell	-	-	-	-	Inodorous.	Inodorous.	
Deposit	-	-	-	-	None.	A little.	
Nitrous Acid	-	-	-	-	None.	None.	
Phosphoric acid	-	-	-	-	Very minute trace.	Trace.	
Metallic impurities	-	-	-	-	Minute trace of lead.	None.	
Hardness before boiling	-	-	-	-	28.5 degrees (Clark.)	21 degrees (Clark).	
" after "	-	-	-	-	11 "	10 "	
Oxygen absorbed from permanganate					Grains per gallon.	Grain per gallon.	
					0.009	0.004	
Total dry residue	-	-	-	-	38.92	39.76	
Consisting of { volatile matter	-	-	-	-	6.16	4.20	
fixed salts	-	-	-	-	32.72	35.56	
Chlorine	-	-	-	-	4.79	7.35	
Nitric acid	-	-	-	-	4.23	2.76	
Ammonia	-	-	-	-	0.0005	0.0010	
Albuminoid ammonia	-	-	-	-	0.0037	0.0028	

A. DUPRÉ.

Westminster Hospital,
June 17, 1880.

L O N D O N :

Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE.

Printers to the Queen's most Excellent Majesty.

For Her Majesty's Stationery Office.

[G. 13.—150.—4/81.]